

Pre-requisite Programs- GMP, GHP, SCP and Implementation of HACCP for Food Safety Management of Fish and Fishery Products

Training Course Module

Sustainable Coastal and Marine Fisheries Project

Department of Fisheries, Matshya Bhaban, Dhaka

Training Manual on “Pre-requisite Programs GMP, GHP, SCP and Implementation of HACCP for Food Safety Management of Fish and Fishery Products

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Acronyms And Abbreviations

ADG	Additional Director General
AFO	Assistant Fisheries Officer
aw	Water activity
BRC	British Retail Consortium.
BSTI	Bangladesh Standard and Testing Institution
CCP	Critical Control Point
CL	Critical Limit
DD	Deputy Director of DoF
DFO	District Fisheries Officer
DG	Director General
DoF	Department of Fisheries, Bangladesh
e.g.	For example
EO	Extension Officer
etc.	Etcetera
FA	Field Assistant
FDA	Food and Drug Administration of USA
FIQC	Fish Inspection and Quality Control
FSMS	Food Safety Management System
GAP	Good Aquaculture Practices
GFSI	Global Food Safety Initiative
GHP	Good Hygiene Practices
GMP	Good Manufacturing Practices
GoB	Government of Bangladesh
HACCP	Hazard Analysis Critical Control Point
HIV	Human Immunodeficiency Virus
ISO	International Organization for Standardization
MFO	Marine Fisheries Officer of SCMFP
MoFL	Ministry of Fisheries and Livestock
NACMCF	National Advisory Committee on Microbiological Criteria for Foods
NAS	National Academy of Sciences
OHS	Occupational Health Safety
pH	Potential of Hydrogen
PIC	Person in Charge
PMU	Project Management Unit
PPE	Personal Protective Equipment
ppm	Parts Per Million
PPT	PowerPoint Presentation
PRP	Pre-Requisite Programs
PSO	Principal Scientific Officer
Q&A	Question and Answers
QC	Quality Control
SCMFP	Sustainable Coastal and Marine Fisheries Project
SCP	Sanitation Control Procedures
SOP	Standard Operating Procedures
SQF	Safe Quality Food
SSOP	Sanitation Standard Operating Procedures
SUFO	Senior Upazila Fisheries Officer
ToT	Training of Trainers
UFO	Upazila Fisheries Officer

Table of Contents

Abbreviations	iii
Introduction to the Course.....	1
Review on good aquacultural practices (GAP) and introduction to GMP, GHP, SCP & HACCP.....	23
Overview on GMP regarding personnel, processing plant & grounds and sanitary operations.....	28
GMP regarding sanitary facilities & controls; equipment utensils.....	35
Good Manufacturing Practices (GMP).....	39
GMP regarding processes and controls.....	41
Good hygiene practices in processing of fishery products.....	48
Introduction to sanitation control procedures.....	59
Condition and cleanliness of food contact surfaces.....	66
Prevention of cross-contamination.....	74
Maintenance of hand washing, hand sanitizing, and toilet facilities.....	80
Protection from adulterants.....	86
Proper labelling, storage, use of toxic compounds and control of employee health conditions.....	91
Exclusion of pests.....	98
Seafood safety hazards: pathogens.....	104
Seafood safety hazards: species & process related.....	109
Pre-requisite programs for HACCP implementation.....	116
Preliminary steps: assemble a HACCP team.....	120
Preliminary steps: describe the product, intended use and consumers.....	123
Preliminary steps: developing process flow chart and process description.....	127
HACCP Principle 1: Hazard Analysis.....	134
HACCP Principle 2: Determine CCP.....	149
Principle 3: Establish Critical limits (CLs).....	154
HACCP Principles 4: CCP Monitoring.....	168
HACCP Principle 5: Corrective actions.....	172
HACCP Principle 6: Establish verification procedure.....	177
HACCP Principle 7: Record keeping procedures.....	184
দুর্যোগ ব্যবস্থাপনা.....	192
জেলার সচেতনতা এবং স্বচ্ছতা.....	200
Course evaluation and closing ceremony.....	207

Introduction to the Course

1. General information about the course

Name of the training course	:	Training on Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products
Participants	:	DoF Officials/Stakeholders
Duration of training course	:	6 Days
	:	Any suitable training place at Division, District or Upazila level
Number of participants per course	:	20

2. Overall aims and objectives of the course

Overall aims of the training-

The overall aims of training on pre-requisite programs such as Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP), Sanitation Control Procedures (SCP), and the implementation of Hazard Analysis and Critical Control Points (HACCP) for food safety management of fish and fishery products are to develop the overall knowledge and skills of the course participants which include:

- (1) Understanding the importance of food safety and the role of pre-requisite programs and HACCP to ensure it;
- (2) Learning the basic principles and guidelines for GMP, GHP and SCP in the production and handling of fish and fishery products;
- (3) Understanding the importance and benefits of GMP, GHP, SCP and HACCP in food safety management;
- (4) Familiarity with relevant food safety regulations and standards, such as FDA regulations and ISO 22000.
- (5) Knowledge of GMP, GHP, SCP, and HACCP principles and their application in the fish and fishery products industry.
- (6) Ability to implement GMP, GHP, SCP, and HACCP in daily operations, from raw material control to finished product release.
- (7) Understanding the importance of monitoring and record-keeping for ensuring food safety.
- (8) Awareness of the role of continuous improvement and on-going food safety training in maintaining a safe food environment.
- (9) Ability to identify and mitigate potential food safety hazards in the production process.
- (10) Knowledge of corrective actions for food safety incidents and their implementation.
- (11) Awareness of the role of pre-requisite programs and HACCP in verifying the safety and quality of fish and fishery products.
- (12) Understanding the importance of stakeholder collaboration and coordination in ensuring food safety throughout the supply chain.

Overall objectives of the learnings-

At the end of this training course the participants will be able to-

- Understand the basic principles of food safety management and the importance of GMP, GHP, SCP and HACCP in ensuring the safety of fish and fishery products.
- Learn how to implement GMP, GHP, SCP and HACCP in a fish and fishery products processing environment.
- Develop skills in identifying and controlling seafood safety hazards associated with fish and fishery products.
- Understand the role of HACCP in identifying and controlling critical control points in the food safety management system and preliminary steps in developing a HACCP plan;
- Learn how to monitor, verify, and document food safety control measures to ensure ongoing compliance with food safety requirements;
- Develop the ability to perform risk assessments and to implement corrective actions to address food safety issues;
- Understand the importance of continuous improvement in food safety management and the role of training and education in achieving this goal;
- Determine Critical Control Points (CCPs), establish critical limits, monitor Critical Control Points;
- Describe corrective actions about preliminary steps in developing a HACCP plan;
- Establish verification procedures and explain record-keeping procedures.

3. Training method

The course will mainly be conducted following a training approach that involves active participation and collaboration among the learners and the facilitator. The focus of this method is on creating an interactive and engaging learning environment where participants can share their knowledge, experiences, and perspectives. Participatory case analysis, PowerPoint, flipchart display, question and answer, role-playing, simulations, problem-solving group exercises and presentations, participatory discussions, individual exercises, lecture-discussions etc. will be followed as techniques to ensure participation. The goal of participatory training is to empower participants to take an active role in their own learning and development, which will lead to higher levels of engagement and retention of information. This will be effective for participants in promoting teamwork, communication skills, critical thinking, and problem-solving skills.

The Question-Pause-Name (QPN) technique- a teaching strategy should be used by the facilitator to encourage active participation and engagement from participants. The steps of this technique are:

- (1) Ask a question: Pose a thought-provoking question related to the topic being discussed.
- (2) Pause: Wait for a few seconds to allow participants time to think about the question and formulate a response.
- (3) Call on a participant to answer: Call on a student to answer the question, either randomly or based on previous performance.

This technique helps participants to engage in the session, promotes critical thinking and encourages them to develop a deeper understanding of the topic being discussed. It also helps to create a more interactive and dynamic learning environment, where participants feel more involved in the session.

Question and Answer (Q&A), on the other hand, typically involves the facilitator asking questions related to the topic and participants answering them immediately. The goal of Q&A is to assess participants' understanding of the material and provide an opportunity for the facilitator to provide clarification and feedback.

While both techniques can be effective in different ways, QPN tends to encourage more active participation and critical thinking among participants, while Q&A provides a more direct assessment of participants' understanding. The choice of which technique to use may depend on the goals of the lesson, the participants' level of understanding, and the facilitator's preferred instruction style.

4. Course format

This course is divided into three distinct parts:

- Good Manufacturing Practices (GMP)
- Good Hygiene Practices & Sanitation Control Procedures, and
- HACCP

The first part is an outline of Good Manufacturing Practices regarding seafood processing.

The second part of the course explains the Good Hygiene Practices & Sanitation Control Procedures.

The third part of the course describes pre-requisite programs, seafood safety hazards and the preliminary steps that must be completed before applying HACCP principles. The seven principles of HACCP are then described to give a better understanding of the fundamentals on which HACCP is based and how the information needed to complete each HACCP principle. The class will progressively develop a HACCP plan by the participants through completing exercises. These exercises will help participants understand HACCP principles and how to apply these principles in seafood processing.

5. Expectations from participants

GMP, GHP, SCP & HACCP are important safety-management systems and can be integrated into any operation for the production of safe food. However, these topics can seem complicated until the basic concepts are understood. Therefore, participants are encouraged to ask questions and to contribute first-hand experiences during the discussions.

The expectations from participants in the training on Pre-requisite programs and HACCP implementation for food safety management of fish and fishery products are:

- (1) To have an understanding of the basics of food safety and the importance of GMP, GHP, SCP and HACCP in the management of fish and fishery products;
- (2) To actively participate in all training sessions and engage in discussions;
- (3) To apply the concepts and principles learned during the training to their respective workplaces;
- (4) To work towards the implementation of a HACCP system in their workplaces and provide feedback on the training for continuous improvement;
- (5) To maintain accurate documentation and records in accordance with the principles of HACCP;
- (6) To continuously strive to improve their knowledge and skills in food safety management and attend further training as required.

Throughout the training, this manual includes exercises requiring class participation. Keeping in mind that the easier the topics will seem and the easier it will be to develop and implement a HACCP plan with more contribution from participants. It is expected that the participants will leave the training with a thorough understanding of the importance of pre-requisite programs and HACCP in ensuring food safety in the management of fish and fishery products.

6. Key definitions and concepts

There are a number of definitions for GMP, GHP, SCP & HACCP terms and key concepts that seafood processors/regulators should understand. Each of these definitions as the corresponding HACCP principle is introduced in this training manual. Key concepts or terms also introduced to understand hazards or appropriate control strategies.

7. Training materials

PowerPoint presentation, boards, markers, multimedia, flipcharts, posters, physical objects, models, hand-outs etc. will be used as aids to implement the training course.

8. Training process or what the facilitator should do

The process of session planning or the responsibilities of the facilitator have been thoroughly outlined. The facilitator has a detailed list of tasks and activities that they and the participants must complete in order to successfully achieve the goals of each session. This list serves as a roadmap for the facilitator, providing them with a clear understanding of what they need to do in order to conduct an effective session. The "to-dos" listed will help the facilitator stay organized and focused, ensuring that they cover all necessary aspects of the session and achieve their desired outcomes.

In addition, having a well-structured plan for each session helps to ensure that everyone is on the same page and working towards the same goals. This level of organization and clarity can help to increase the efficiency of the session and make it more productive. The facilitator can use the step-by-step list as a reference throughout the session, to ensure that they are staying on track and addressing all necessary topics. Furthermore, having a clear plan can also help to alleviate any stress or anxiety that the facilitator may have, as they have a concrete understanding of what they need to do and can follow a clear set of instructions. Overall, the process of session planning and the clear guidelines provided for the facilitator play a crucial role in ensuring that each session is a success.

9. For Instructors: Rules for the Use of the Course Manual

This manual is designed to assist in achieving the training goals and learning objectives. The following points should be considered by the facilitator in using this manual.

- The objectives of the session are recorded on the first page of the session to be presented. A facilitator's key responsibility is to conduct the session in a participatory manner to achieve specific objectives. That is why it is necessary to understand the objectives well.
- Lists of materials required for conducting the sessions are mentioned. These materials should be collected or prepared in advance. Otherwise, awkward situations may arise in session management.
- Session planning methods, timing, process and materials are mentioned. Guidelines and related materials should be well prepared before conducting the session. Conducting the session by eyeing at the session plan can in many cases disrupt the smoothness and speed of the session presentation.
- Session steps need to be followed sequentially. Otherwise, the continuity of the session may be lost. Session objectives and topics for continuity need to be written on multi-media, flipcharts and exchanged with participants. However, it is not necessary to inform the participants about the purpose of the session, the instructor's instructions, etc.
- When discussing a topic, presenting practical examples as necessary to analyze and clarify the topic increases the interest of the session. Prior preparation requires thorough reading of the hand-outs and attached materials and the assistance of other relevant reference materials.
- The materials which need to be distributed among the participants should be properly checked in advance by making required number of copies so that they can be distributed on time.
- At the beginning of each session interesting introduction should be given so that the participants could understand the importance of the session and concentrate. Acquaintances to previous sessions need to be made; otherwise discussions will feel disorderly to participants. At the end of each session, whether the objectives of that session have been achieved or not should be verified through question and answer or some other techniques. Study opinion and feedback from participants through training evaluations and take necessary action for subsequent courses accordingly.

10. Flexibility in using this Manual

- This manual should be used as a guide for conducting training;
- The proposed method, process, time, materials etc. may be modified as necessary considering the level, knowledge, skills and expectations of the participants. There is also scope for adding new objectives and adding new themes and subjects accordingly in the proposal;
- The facilitator may choose to highlight certain topics more or skip some sections based on the participants' prior knowledge and the relevance of specific topics to their work environment.
- The facilitator may choose to supplement the training manual with additional slides, videos, or case studies to better illustrate certain concepts or provide practical examples.
- To make the session more participatory, the above method can be modified or a new method can be used to conduct the session;
- The total time fixed for a session could be changed if necessary for different paces. Over again, if necessary, the total time can be adjusted by rescheduling multiple sessions;
- The text and other materials included in the manual might be modified according to the needs, i.e., the text and materials may perhaps need to be changed, expanded and adapted;
- Remember, some topics in the course manual may need updating, expanding, or correcting to reflect reality. Only make changes as needed and for improvement, but ensure the manual's quality is not compromised.
- The text used in this manual has been adapted to enhance the facilitator's knowledge and skills. These topics should be presented to the participants in simple language considering their educational qualification, knowledge, experience etc.
- In general, this training manual should be seen as a guide, not a rigid script, and the facilitator should feel free to modify it as necessary to best meet the needs of the participants and ensure a successful training experience.

Session Plan

Day: 01	Session: 1.1	Duration: 30 Minutes
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Session Title: Registration

Learning objectives

At the end of this session, participants will be able to-

- Complete the registration process for the training course;
 - Receive training materials and any other relevant materials (if any);
 - Confirm attendance for the training course by responding to any confirmation requests or by contacting the course coordinator;
- Prepare for the training by gathering any necessary materials or equipment, such as a laptop or note-taking tools.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system with written objectives and training

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Welcome participants to the training course. Give a brief idea of the purpose of the training and appeal to all for spontaneous and active participation from their respective positions for next six days. <i>Example: "Greetings participants! We are delighted to welcome you to this training course. Our aim is to provide you with a comprehensive understanding of the purpose and content of all sessions and to encourage all of you to actively engage and participate throughout the course.</i> <i>We believe that every person has unique experiences, perspectives and insights to offer, and we encourage you to bring these to the table. Your spontaneous and active participation from your respective positions will help to make this training course not only informative, but also interactive and engaging.</i> <i>"In this training course, we aim to provide you with a deeper understanding of the topic at hand and equip you with the necessary knowledge and skills to perform your duties more effectively. Our goal is to create an environment that fosters open communication, collaboration and learning, where everyone can share their thoughts, ask questions and provide feedback.</i> <i>By actively participating in this training course, you will have the opportunity to deepen your understanding of the topics, ask questions, provide feedback, and learn from each other. Our hope is that this course will serve as a platform for you to network, learn and grow both professionally and personally.</i> <i>So, once again, we welcome you to this training course and encourage you to actively participate and make the most of this</i>	2 Minutes

Steps	Main topics of discussion	Session presentation process	Time
		<i>opportunity. We look forward to an engaging and productive training."</i> <i>So, "Let's begin the registration process for the GMP, GHP, SCP, and HACCP training course!"</i>	
Step-2	Registration	At this time request the participants to register by providing the registration sheet and provide them with the necessary materials (notebooks, pens, files/folders) along with the registration.	25 Minutes
Step-3	Collection of filled-up forms	Conclude the session by collecting the filled-up registration sheets and end this session by emphasizing the next session.	3 Minutes

Session Plan

Day: 01	Session: 1.2	Duration: 60 Minutes
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Session Title: Opening, introduction of participants and pre-evaluation

Learning objectives

At the end of this session, participants will be able to-

- Familiar with brief introduction of the training course, its objectives, and the agenda for the day by the trainer/facilitator;
- Introduce themselves, their background, and their reasons for attending the training;
- Introduce to invited guests;
- Able to establish relationships by knowing and understanding each other well;
- Conduct pre-training assessment using specific questionnaires;
- Express individual expectations for the training and to establish a positive and collaborative learning environment;
- Acquainted with brief overview of the course content and the materials that will be used during the training;
- Discourse about course aims, objectives and structure;
- Discourse about different topics of this course;
- Can create a policy to follow during training.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system with written objectives and training

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Welcome participants to the session. Give a brief idea of the purpose and content of the session and appeal to all for spontaneous and active participation from their respective positions.	3 Minutes
Step-2	Introduction	At the opening session, all attendees should be invited to participate. The guests should be given the opportunity to speak one by one and a request can be made for one of them, or the chief guest, to officially announce the start of the training. It is important to know the names, titles, and credentials of the guests in advance. After the guests have spoken, everyone should be thanked for attending and the session should be wrapped up by summarizing the topic of the training. It is important to create a welcoming and inclusive atmosphere at the opening session. This can be achieved by making sure everyone is comfortable and feels heard. The guests should be introduced by their names, titles and credentials; this not only helps to establish their expertise in the field but also gives recognition to their achievements. During the session, it is crucial to keep the attendees engaged and focused; this can be done by keeping the discussion on topic and encouraging questions and	7 Minutes

		participation from the audience. Additionally, highlighting the significance of the training and what attendees can expect to learn from it will help to build excitement and anticipation for the upcoming sessions. At the end of the opening, acknowledging and thanking the guests for taking time to attend and participate, as well as all the attendees for their presence will create a sense of appreciation and community.	
Step-3	Self-Introduction	Now ask the participants to introduce themselves one by one by mentioning their name, identity, current workplace etc. or complete the introduction phase in any other attractive way. After introducing everyone, start the next step by introducing yourself and thanking you.	10 Minutes
Step-4	Pre-test	The pre-training assessment is an important step in evaluating the participants' current level of knowledge and understanding before the training program begins. The questionnaire attached to the training manual provides an opportunity to gauge their strengths and weaknesses and to tailor the training content to meet their specific needs. It is important to ensure that the trainees understand the questionnaire properly before they start completing it. This can be achieved by providing a thorough explanation of each question, including any instructions or examples to help the trainees understand what is expected of them. The facilitator can also take time to answer any questions the participants may have and clarify any ambiguities. By doing this, the participants can feel confident in completing the questionnaire, and the results will be more accurate and representative of their current abilities. Complete the pre-training assessment using the questionnaire attached to the training manual. Help the trainees to understand the question paper properly.	20 Minutes
Step-5	Setting expectations	Ask the participants what they want to learn and understand from the training course i.e., what are their expectations from the training. At this time, keep an eye on the reflection of everyone's opinion. After writing the expectations, read out the received expectations and write them on a large paper and hang them on the wall.	6 Minutes
Step-6	Description of goals, objectives and training schedule	Present and discuss written PPT slides on overall learning objectives, training plan and provide hand-outs to all - Overall learning objectives: Start with an introduction to the overall goals and objectives of the training program. Explain what the participants will learn and how the training will benefit them. - Training plan: Present the detailed training plan including the schedule, topics to be covered, and the trainers. Highlight the key features of the training program and the strategies that will be used to deliver the content effectively.	5 Minutes

		▪ Handouts: Discuss the importance of handouts in reinforcing the learning objectives and ensuring that the participants have a reference guide to refer to after the training. Outline the contents of the handouts and the format in which they will be provided.	
Step-7	Training policies	Expect everyone's assistance in completing the six-day training course in a timely and successful manner by following the principles of spontaneous and active participation, exchange of experiences, and mutual learning. During the training, the following principles are to be followed to ensure a productive and effective learning experience: • Silencing mobile phones and refraining from talking on them in the classroom; • Starting and finishing on time; • Adhering to deadlines; • Learning through mutual exchange of experiences, etc. Ask everyone to observe these principles and contribute to the success of the training course. Additionally, it is also important to: • Respect each other's opinions and perspectives; • Focus on the topic at hand and refrain from distractions; • Encourage open and honest communication; • Be on time for all sessions and activities; • Ask questions and clarify any doubts; • Contribute actively to group discussions and activities. By following these principles, everyone can work together to make the most of the training and achieve the desired outcomes. The success of the training depends on the collective efforts of all participants, so let's make sure we are all fully engaged and committed to the process.	10 Minutes
Step-7	Summary	To wrap up the session, it is important to summarize what has been discussed and accomplished. This can be done by highlighting the key points and reiterating the objectives of the training. This helps to reinforce the information and ensure that everyone has a clear understanding of what was covered. After the summary, it is a good idea to brainstorm potential topics for the next session. This can help to keep attendees engaged and provide a sense of what is to come. Before ending the session, it is important to provide information about the location of food, water, and bathroom facilities, as well as to remind attendees about any policies that have been put in place for the purpose of the training. Finally, it is essential to verify that everyone has received all necessary materials those were distributed. To end the session, highlight the next session, mentioning time and location, this will help attendees plan and be prepared for the upcoming sessions.	4 Minutes

Sustainable Coastal and Marine Fisheries Project (SCMFP)

Department of Fisheries, Bangladesh

Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products

Duration: From To

Venue:

Registration Form

	Name	Designation	Place of Posting		Mobile No. and E-mail ID	Age (Years)	Educational Qualification	Signature
			Upazila	District				
1								
2								
3								
4								
5								
6								
7								
8								



	Name	Designation	Place of Posting		Mobile No. and E-mail ID	Age (Years)	Educational Qualification	Signature
			Upazila	District				
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Trainer's Name and Signature:

Date:

Sustainable Coastal and Marine Fisheries Project (SCMFP)

Department of Fisheries, Bangladesh

Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products

Duration: From..... To

Venue:.....

Daily Attendance Sheet

	Name	Designation	Place of Posting		Mobile No. and E-mail ID	Age (Years)	Educational Qualification	Signature
				District				
1								
2								
3								
4								
5								
6								
7								
8								

	Name & Designation	Place of Posting and Mobile No.	Attendance with Signature					
			Day-1	Day-2	Day-3	Day-4	Day-5	Day-6
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Trainer's Name and Signature:

Date:

Training Schedule

Training Course on “Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products”

Duration: 6 Days

Time Day	08:00-08:30	8:30-09:30		09:45-10:45	10:45-11:45		12:00-13:00	13:00-14:00	18:00-20:00 (Evening Work)
Day 1	Registration	Opening, introduction of participants & pre-evaluation		Review on Good Aquacultural Practices (GAP) and introduction to GMP, GHP, SCP & HACCP	Overview on GMP, GHP regarding personnel, Processing plant & grounds and Sanitary operations		GMP regarding Sanitary facilities & controls; Equipment & utensils;	GMP regarding Processes and controls	4 Group (5 members) Each Group will prepare a Poster Regarding GMP Components Requirements
Day 2	Review and feedback of previous day's learning	Good Hygiene Practices (GHP) in processing of fishery products	T	Introduction to Sanitation Control Procedures (SCP)	Condition and Cleanliness of Food Contact Surfaces	T	Prevention of cross-contamination	Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities	- Personnel hygiene of worker - Cleaning of food contact surface in 3 or 4 group
Day 3	Review and feedback of previous day's learning	Protection from adulterants	E	Proper labeling, storage, use of toxic compounds and control of employee health	Exclusion of pests	A	Seafood Safety Hazards: Pathogens	Seafood Safety Hazards: Species & Process related hazards	Find out species & product related hazards from Hazard Control Guidance Manual in 2 or 3 group
Day 4	Review and feedback of previous day's learning	Pre-requisite Programs for HACCP implementation	B	Preliminary steps: Assemble a HACCP team	Preliminary steps: Describe the product, intended use and consumers	B	Preliminary steps: Develop a process flow chart and process description	Exercise - Develop a process flow chart and process description	Assemble a HACCP team & Develop a process flow chart and process description in 2 or 3 group.
Day 5	Review and feedback of previous day's learning	HACCP Principle 1- Hazard Analysis	R	Exercise - Hazard Analysis	HACCP Principle 2- Determine CCP	R	Principles 3- Establish Critical limits	Exercise - Establish critical limits	Prepare a “Product Flow-chart, Hazard Analysis Worksheet and HACCP Plan” description in 2 or 3 group
Day 6	Review and feedback of previous day's learning	HACCP Principles 4- CCP Monitoring; Principle 5- Corrective actions	E	HACCP Principle 6- Establish Verification Procedure; Principle 7- Record Keeping Procedure	দুর্যোগ ব্যবস্থাপনা (Disaster Management)	E	জেন্ডার সচেতনতা এবং অঙ্গীকার (Gender Awareness and Integrity)	Course evaluation and closing ceremony	

Session Details

Time		Session no.	Session title	Methods and techniques
From	To			
Day 1				
08:00	08:30	1.1	Registration	Speech and discussion
08:30	09:00	1.2	Opening and introduction of participants	Speech and discussion
09:45	10:45	1.3	Review on Good Aquacultural Practices (GAP) and introduction to GMP, GHP, SCP & HACCP	Discussion and Q&A
10:45	11:45	1.4	Overview to Good Manufacturing Practices, GMP regarding personnel, Processing plant & grounds and Sanitary operations	Discussion and Q&A
12.00	13:00	1.5	GMP regarding Sanitary facilities & controls; Equipment & utensils; Warehousing & distribution; holding & distribution of by-products and defect action levels	Discussion and Q&A
13:00	14:00	1.6	GMP regarding Processes and controls	Discussion and Q&A
Day 2				
08:00	08:30	2.1	Review and feedback of previous day's learning	Discussion and Q&A
08:30	09:00	2.2	Good Hygiene Practices (GHP) in processing of fishery products	Discussion and Q&A
09:45	10:45	2.3	Introduction to Sanitation Control Procedures (SCP)	Discussion and Q&A
10:45	11:45	2.4	Condition and Cleanliness of Food Contact Surfaces	Discussion and Q&A
12.00	13:00	2.5	Prevention of cross-contamination	Discussion and Q&A
13:00	14:00	2.6	Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities	Discussion and Q&A
Day 3				
08:00	08:30	3.1	Review and feedback of previous day's learning	Discussion and Q&A
08:30	09:00	3.2	Protection from adulterants	Discussion and Q&A
09:45		3.3	Proper labelling, storage, use of toxic compounds and control of employee health conditions	Discussion and Q&A
10:45	11:45	3.4	Exclusion of pests	Discussion and Q&A
12.00	13:00	3.5	Seafood Safety Hazards: Pathogens	Discussion and Q&A
13:00	14:00	3.6	Seafood Safety Hazards: Species & Process related hazards	Discussion and Q&A

Time		Session no.	Session title	Methods and techniques
From	To			
Day 4				
08:00	08:30	4.1	Review and feedback of previous day's learning	Discussion and Q&A
08:30	09:00	4.2	Pre-requisite Programs for HACCP implementation	Discussion and Q&A
09:45	10:45	4.3	Preliminary steps: Assemble a HACCP team	Discussion and Q&A
10:45	11:45	4.4	Preliminary steps: Describe the product, intended use and consumers	Discussion and Q&A
12:00	13:00	4.5	Preliminary steps: Develop a process flow chart and process description	Discussion and Q&A
13:00	14:00	4.6	Exercise- Develop a process flow chart and process description	Discussion and Group Work
Day 5				
08:00	08:30	5.1	Review and feedback of previous day's learning	Discussion and Q&A
08:30	09:00	5.2	HACCP Principle 1- Hazard Analysis	Discussion and Q&A
09:45	10:45	5.3	Exercise – Hazard Analysis	Discussion and Q&A
10:45	11:45	5.4	HACCP Principle 2- Determine CCP	Discussion and Q&A
12:00	13:00	5.5	Principles 3- Establish Critical limits	Discussion and Q&A
13:00	14:00	5.6	Exercise – Establish critical limits	Discussion and Q&A
Day 6				
08:00	08:30	6.1	Review and feedback of previous day's learning	Discussion and Q&A
08:30	09:00	6.2	HACCP Principles 4- CCP Monitoring; Principle 5- Corrective actions	Discussion and Q&A
09:45	10:45	6.3	HACCP Principle 6- Establish Verification Procedure; Principle 7- Record Keeping Procedure	Discussion and Q&A
10:45	11:45	6.4	দুর্যোগ ব্যবস্থাপনা (Disaster Management)	Discussion and Q&A
12:00	13:00	6.5	জেন্ডার সচেতনতা এবং শুদ্ধাচার (Gender Awareness and Integrity)	Discussion and Q&A
13:00	14:00	6.6	Course evaluation and closing ceremony	Speech and discussion

Pre-Training Assessment Questionnaire

Total number: 100 (all questions are of equal value)

Time: 20 minutes

Name:

Designation & affiliation:

Put a tick (✓) where applicable

1. Elaborate the following terms-
 - a) GMP -
 - b) SCP -
 - c) HACCP -
 - d) CCP -
2. What are the major good practices for ensuring environmental integrity in aquaculture activities?
 - a) Monitoring farm environmental quality and efficient water management
 - b) Using hatchery-produced seed for culture
 - c) Construction and waste disposal should be conducted responsibly
 - d) All of the above
3. HACCP is a system of food safety hazard controls rather than reactive one.
 - a) Corrective
 - b) Protective
 - c) Preventive
 - d) None of the above
4. The HACCP concept was first applied to food production during efforts to supply safe food for the United States space program in the early
 - a) 1980s
 - b) 1960s
 - c) 1970s
 - d) None of the above
5. is a system that ensures that the goods produced by various manufacturing facilities are consistently produced and controlled according to specified quality standards.
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
6. Identified hazards which are inherent to the product or are associated with a discrete processing step must be controlled with
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
7. Hazards associated with the processing environment or personnel are usually better controlled with
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above

8. is the transfer of biological or chemical contaminants to food products from raw foods, food handlers, or the food handling environment.
- a) Prevention
 - b) Correction
 - c) Contamination
 - d) Cross-contamination
9. A is defined as any biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of control(s).
- a) GMP
 - b) Hazard
 - c) SCP
 - d) None of the above
10. Unique hazards that are associated with specific types or species of finfish and shellfish.
- a) Process-related hazard
 - b) Species related hazards
 - c) Aquaculture drugs
 - d) None of the above
11. Potential food safety hazards that may be associated with specific types of finished fishery products as a result of the finished product form, the package type, the method of distribution and storage, or the processing methods that are used.
- a) Process-related hazard
 - b) Species related hazards
 - c) Aquaculture drugs
 - d) None of the above
12. Common viral pathogens associated with fish and fishery products?
- a) Hepatitis A Virus
 - b) HIV
 - c) Influenza
 - d) None of the above
13. When a bacterium exists as a spore, it is very resistant to chemicals, heat and other treatments that would normally be lethal to non-sporeforming bacteria.
- a) True
 - b) False
14. GMP & SCP are Pre-requisite in order to implement HACCP program.
- a) True
 - b) False
15. Histamine production in finfish can be controlled by -
- a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
16. Contamination with pathogens due to not washing hands before touching product by processing worker can be controlled by -
- a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
17. Which is not a preliminary step before building a HACCP plan?
- a) Assemble HACCP team
 - b) Describe the product
 - c) Corrective action
 - d) Develop a process flow chart

- [illegible]

Session Plan

Day: 01	Session: 1.3	Duration: 60 Minutes
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Session Title: Review on GAP and introduction to GMP, GHP, SCP & HACCP

Learning objectives

At the end of this session, the participants will be able to-

- Understand the principles and benefits of sustainable aquaculture.
 - Gather knowledge of responsible fish and seafood production methods.
 - Aware of environmental and social impacts of aquaculture.
 - Familiar with relevant regulations, standards and certifications.
 - Implement GAP in daily practices, from feed management to disease control.
 - Aware of market demands and consumer expectations for sustainable seafood.
 - Identify and assess potential risks in aquaculture operations.
 - Gather knowledge on waste management and water quality management practices.
 - Understand responsible sourcing of inputs, such as feed and seed.
 - Familiar with GMP principles and guidelines, including sanitation, documentation, and record-keeping.
 - Aware of the role of GMP in maintaining a hygienic and controlled production environment.
 - Identify and control potential sources of contamination and cross-contamination.
 - Explain product and process validation procedures.
 - Understand the importance of employee training and development in maintaining GMP compliance.
 - Implement GMP in daily practices, from raw material control to finished product release.
 - Understand the HACCP principles and their role in ensuring food safety.
 - Explain the 7 steps of the HACCP process, including hazard analysis, critical control points, monitoring, and corrective actions.
 - Aware on the importance of food safety and its impact on public health.
 - Familiar with relevant food safety regulations and standards, such as FDA regulations and ISO 22000.
 - Identify potential food safety hazards in the production process.
 - Understand the critical control point (CCP) identification, selection monitoring and record-keeping procedures for CCPs.
- Implement HACCP in daily practices, from raw material control to finished product release.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, white board & markers, sound system, handouts, etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and relating with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Review on GAP	Check participants' understanding of Good Aquaculture Practices through question and answer. Now present and discuss the review on GAP using PPT slides and the attached hand-out.	20 Minutes
Step-3	Introduction to GMP, GHP, SCP	Following Step-2, the understanding of the participants regarding the terms GMP (Good Manufacturing Practices), GHP (Good Hygiene Practices), and SCP (Sanitary Control Procedures) is to be assessed through a question and answer session. A short overview of GMP, GHP, and SCP is to be provided to the participants using PowerPoint slides and an accompanying handout. The slides should present the basics of each of these terms, including their purpose and key components. The handout can provide additional information and serve as a reference for the participants. It is important to keep the presentation interactive by encouraging participant involvement and answering any questions that may arise. Upon conclusion of the overview, a summary of the key points covered is to be given and any final questions or comments from the participants are to be solicited	15 Minutes
Step-4	HACCP	Following Step-3, assess participants' understanding about HACCP through question and answer. Now present and discuss the topic consistently using PPT slides and the attached hand-out.	15 Minutes
Step-5	Summary and Evaluation	After completing Step 4, it is important to assess the participants' understanding of the key learning points covered in the session. This can be done by asking questions and facilitating a discussion to gauge their comprehension of the material. It is crucial to verify that the participants have a clear understanding of the topics covered, as this will help ensure that they retain the information and can apply it in the future. Once the participants' understanding has been confirmed, it is appropriate to end the session by summarizing the topics covered and thanking everyone for their participation. This helps to reinforce the key learning points and provides closure for the session. It also acknowledges the effort put in by the participants and helps to foster a positive and engaged atmosphere. Summarizing the session also provides an opportunity for the facilitator to reiterate the importance of the topics covered and to encourage the participants to continue learning and applying what they have learned.	15 Minutes

Review on Good Aquacultural Practices and introduction to GMP, GHP, SCP & HACCP

Good aquaculture practices (GAP) are a series of considerations, procedures, and protocols designed to foster efficient and responsible aquaculture production and expansion and to help ensure final product quality, safety, and environmental sustainability. GAP include considerations for: site location; production system design; incoming seed stock; facility biosecurity; feeding management; procurement, and storage; production techniques to maximize fish health; harvest; and cleaning and sanitation basics to ensure final product quality and safety. This session provides a review and general framework for GAP.

Good Aquaculture Practices (GAP) are a set of guidelines and standards aimed at promoting sustainable and responsible fish and seafood farming. The main objective of GAP is to ensure that the production of fish and seafood products is carried out in a manner that minimizes environmental impact, protects human health and welfare, and produces safe and high-quality products.

GAP covers a wide range of topics, including site selection, water management, feed and nutrient management, disease control, and environmental impact assessment. The principles of GAP are based on sound science and incorporate the latest research findings and best practices from the aquaculture industry.

Adherence to GAP helps to ensure that fish and seafood products are produced in an environmentally sustainable manner, and also helps to build consumer confidence in the safety and quality of these products. Additionally, GAP can contribute to the economic success of aquaculture operations by reducing production costs, increasing efficiency, and improving product quality.

Overall, GAP is an important tool for promoting responsible and sustainable aquaculture practices, and is widely recognized and supported by the international community, including government agencies, industry organizations, and environmental groups.

Food safety

Aquaculture activities should be conducted in a manner that ensures food safety by implementing appropriate food safety standards and regulations. To meet this requirement major good practices are –

- Aquaculture facilities should be located in areas where the risk of contamination is minimized or where sources of pollution can be controlled or mitigated.
- Where feed is used, aquaculture operations should include procedures for avoiding feed contamination.
- Aquaculture operations should use feeds and feed ingredients which do not contain unsafe levels of biological, chemical and physical contaminants and/or other adulterated substances.
- Farmers should only purchase commercial feed that has been registered to the competent authority and properly labelled in compliance with requirements of the competent authority.
- If veterinary drugs and chemical treatment is necessary, use only registered veterinary drugs and chemicals and follow the instruction on the manufacturers label or as advised by competent authority.
- Water used for aquaculture should be of a quality suitable for the production of fish which is safe for human consumption.
- The source of brood stock, and seed for culture (larvae, post larvae, fry and fingerling) should be such that it reduces the risk of carryover of potential human health hazards.
- Aquaculture facilities should be designed, operated and maintained in ways that prevent contamination from workers, sewage/toilets, domestic animals, machinery oil/fuel and other possible sources in order to maintain hygienic conditions.
- Appropriate harvesting and post-harvest handling, of aquaculture products within the farm should be practiced to minimize contamination and physical damage.

Animal health and welfare

Aquaculture activities should be conducted in a manner that assures the health and welfare of farmed aquatic animals, by optimizing health through minimizing stress, reducing aquatic animal disease risks and maintaining a healthy culture environment at all phases of the production cycle. To maintain aquatic health and welfare major good practices are –

- Aquatic animal health management programs and movement of aquatic animals and aquatic animal products should take place in accordance with the relevant provisions in the OIE Aquatic Animal Health Code to prevent introduction or transfer of diseases and infectious agents pathogenic to aquatic animals.
- A culture environment should be maintained to benefit aquatic animal health and welfare, and reduce the risks of introduction and spread of aquatic animal diseases. In particular, by:
 - Routine monitoring of stock and environmental conditions for early detection of aquatic animal health problems; and
 - Implementation of management practices that reduce the likelihood of disease transmission.
- Veterinary medicines should be used in responsible manners that ensure effectiveness for animal health and protection of the environment.
- Seed should be of good quality/healthy and from reliable source.

Environmental integrity

Aquaculture should be planned and practiced in an environmentally responsible manner in accordance with applicable national and international rules and regulations. Ensuring environmental integrity requires that environmental impacts of planning, development and operational practices for aquaculture are addressed. To maintain environmental integrity major good practices are –

- Regular monitoring of farm environmental quality should be carried out, combined with good record-keeping and use of appropriate methodologies.
- Measures should be adopted to promote efficient water management and use, as well as proper management of effluents to reduce impacts on surrounding land, and water resources.
- Where possible, hatchery produced seed should be used for culture. When wild seeds are used, they should be collected using responsible practices or in accordance with national laws and regulations where they exist.
- Farm infrastructure construction and waste disposal should be conducted responsibly.
- Feeds, feed additives, chemicals, veterinary drugs, including antimicrobials, manure and fertilizer should be used responsibly to minimize their adverse impacts.

Socio-economic aspects

Aquaculture should be conducted in a socially responsible manner, within national rules and regulations, having regard to the ILO-convention on labour rights not jeopardizing the livelihood of aquaculture workers and local communities. Aquaculture contributes to rural development, enhances benefits and equity in local communities, alleviates poverty, and promotes food security. As a result, socioeconomic issues should be considered at all stages of aquaculture planning, development and operation. The importance of corporate social responsibility from aquaculture to local communities should be recognized. Good practices regarding socio-economic aspects are -

- Workers should be treated responsibly and in accordance with national labor rules and regulations and, where appropriate, relevant ILO conventions.
- Workers should be provided with decent working conditions for both genders.
- Child labor should not be used.
- Farm operators shall demonstrate equal rights on public land and water use.
- Farm operators should take measures to minimize potential adverse impacts on the local community during all phases of farm operation.
- Safe farm work conditions must be ensured at all times.

Introduction to GMP, GHP, SCP & HACCP

This course provides training for the seafood industry and regulators consistent with regulatory requirements of the Fish and Fish Products (Inspection and Quality Control) Rules, 1997 (Amended 2008, 2014, 2017) implementation of Quality Assurance Program (QAP) based on HACCP. The rules became effective to ensure the safe processing of fish and fish products. To meet the requirements of the rules training is required for persons responsible for developing and modifying the HACCP plan and for reviewing records. This course contains the information necessary to meet the HACCP training requirements outlined in Rule 19 in the Fish and Fish Products (Inspection and Quality Control) Rules 1997.

Food safety system

HACCP is a preventive system for ensuring food safety, but it is not a standalone system. To be effective, HACCP must be built upon food safety programs such as Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP) and Sanitation Control Procedures (SCP). These programs are known as “Pre-requisites” that provide a foundation for the HACCP.



Good Manufacturing Practices (GMP)

Good Manufacturing Practices (GMP) is the basis for determining whether the facility, processing methods, practices and controls used to process food products are suitable to allow for the production of safe and wholesome food and whether the products have been processed under sanitary conditions.

GMP outline the minimum standards that a food processing facility needs to meet including (but not limited to): personnel, buildings and facilities, equipment, production and process controls, raw materials, and manufacturing operations.

Good Hygiene Practices (GHP) & Sanitation Control Procedures (SCP)

GHP refer to all practices regarding the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain from primary production through to handling of the final product.

SCP are the necessary procedures to meet specified GMP requirements which, in the absence of control, could impact food safety. When SCP are in place, HACCP plans can more effectively focus on the hazards associated with the product or process and rather than the processing plant environment or employee practices.

By properly implementing GHP & SCP, a processor is able to control potential food safety hazards caused by unsanitary conditions associated with the plant environment and employee practices.

HACCP

HACCP is a preventive system of food safety hazard controls rather than a reactive one. Food processors can use it as a management tool to ensure safer food products for consumers. The HACCP system is designed to identify the unique food safety hazards associated with specific types of products or processing operations and then to develop a HACCP Plan to prevent, eliminate or minimize those hazards.

HACCP is an acronym that stands for Hazard Analysis and Critical Control Point. It is a systematic approach to the identification, evaluation and control of food-safety hazards. The concepts behind this term are important.

HACCP is not a zero-risk system, but it is designed to minimize the risk of food-safety hazards to acceptable levels. It is a proven approach to help assure food safety.

Brief history of HACCP

The HACCP concept was first applied to food production during efforts to supply safe food for the United States space program in the early 1960s. It was decided that existing quality control techniques did not provide adequate assurance against contamination during food production. The end-product testing necessary to provide assurance that the food would be safe would be so extensive that little food would be available for space flights. Currently, HACCP has been adopted by many food processors to assure the safety of their food products.

In 1985 the National Academy of Sciences (NAS) recommended that the HACCP approach be adopted by all regulatory agencies and that it should be mandatory for food processors. This recommendation led to the formation of the National Advisory Committee on Microbiological Criteria for Foods (NACMCF).

This committee standardized the HACCP principles used by industry and regulatory authorities. HACCP is endorsed worldwide by many countries and organizations, and although the regulatory approaches may differ from one nation to another, the HACCP concepts are the same.

Seven principles of HACCP

All domestic and international HACCP control systems are based on seven basic principles or steps. These principles will be explained in more detail in this course.



- 1 Conduct a hazard analysis
- 2 Determine the critical control points (CCPs)
- 3 Establish the critical limits
- 4 Establish monitoring procedures
- 5 Establish corrective actions
- 6 Establish verification procedures
- 7 Establish Record Keeping

Session Plan

Day: 01	Session: 1.4	Duration: 60 Minutes
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Session Title: GMP regarding personnel, Processing plant & grounds and Sanitary operations

Learning objectives

At the end of this session, participants will be able to-

- Explicate Good Manufacturing Practices (GMP) including-
 - Understanding of GMP principles and requirements;
 - Understanding of the role and responsibilities of personnel in maintaining GMP standards;
 - Awareness of the importance of personal hygiene in preventing contamination;
 - Knowledge of proper hand washing and protective clothing requirements; Processing Plant & Grounds:
 - Knowledge of GMP requirements for facility design, construction, and maintenance;
 - Understanding of the importance of preventative measures for contamination and mix-ups;
 - Knowledge of GMP requirements for equipment design, construction, and maintenance;
 - Understanding of the importance of pest control measures; Sanitary Operations:
 - Understanding of GMP principles and requirements for manufacturing processes;
 - Knowledge of measures to prevent contamination and cross-contamination;
 - Understanding of GMP requirements for cleaning and sanitizing equipment and facilities;
 - Awareness of the importance of proper waste disposal to prevent contamination of products or the environment.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, white board, markers, sound system and handouts.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Overview on GMP	Assess participants' understanding about GMP through question and answer. Now present and discuss the topic consistently using PPT slides and the attached hand-out.	10 Minutes
Step-3	GMP regarding personnel	Check participants' understanding about GMP requirements for personnel through question and answer. Now present and discuss the topic consistently using PPT slides and the attached hand-out.	15 Minutes
Step-4	GMP regarding processing plant & grounds	Assess their understanding about GMP requirement for processing plant & grounds. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-5	GMP regarding sanitary operations	Assess participants understanding about the sanitary operations. Now present the topic using PPT slides and attached hand-out.	15 Minutes
Step-6	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	10 Minutes

Overview on GMP regarding personnel, Processing plant & grounds and Sanitary operations

Overview on GMP

GMP looks at every aspect of the manufacturing process to guard against potential risks that can prove detrimental to the products being produced. Cross-contamination, mislabeling, and adulteration are just a few of the things GMP aims to prevent.

Good Manufacturing Practices (GMP) is a set of guidelines and regulations aimed at ensuring the production and handling of food products are done in a manner that guarantees the safety and quality of the final product. GMP covers all aspects of food production, from raw material procurement to packaging and distribution. The goal of GMP is to minimize the risks involved in food production that could harm the consumer, such as contamination with harmful substances or the spread of foodborne illnesses.

GMP generally address matters including appropriate personal hygienic practices, design and construction of a food plant and maintenance of plant grounds, plant equipment, sanitary operations, facility sanitation, and production and process controls during the production of food.

These Practices are made to be flexible, to better allow processors to adjust them to fit their specific needs. However, to meet the GMP, certain areas still have to be met accordingly.

Why GMP important in seafood processing

Good Manufacturing Practices are a critical system that all manufacturing facilities should implement. They help ensure the proper design, monitoring, and control of the manufacturing processes and facilities. Companies that adhere to these standards help to assure the identity, strength, and quality of their products. When implemented, GMP can help to cut down on facility losses and waste and help to protect the company, consumer, and the environment from harm.

The Good Manufacturing Practices give manufacturers across all industries a set of standards to strive for. They help facilities earn and maintain the trust of consumers who want to know the products they buy are manufactured in safe, well-regulated environments, and to government standards.

Good Manufacturing Practices in seafood industry manufacturers are especially vital these days, due to -

- *the increasing number of food recalls occurring;*
- *consumers have become increasingly aware of food safety;*
- *companies to increase their accountability and provide safe products*

GMP and Sanitation Control

Good Manufacturing Practices (GMP) and Sanitation Control are closely related concepts in the food industry. GMP refers to a set of guidelines and regulations aimed at ensuring the production and handling of food products are done in a manner that guarantees the safety and quality of the final product. Sanitation control, on the other hand, refers to the measures taken to maintain clean and hygienic conditions in food production facilities.

Sanitation control is a critical component of GMP and is included as one of the guidelines to be followed. It involves the implementation of procedures and processes aimed at preventing contamination of food products by harmful substances, such as bacteria, viruses, chemicals, and physical contaminants. This includes regular cleaning and sanitizing of equipment and facilities, proper storage and handling of raw materials, and ensuring that personnel follow hygienic practices such as handwashing and wearing appropriate protective clothing.

Adherence to sanitation control measures helps to minimize the risk of food contamination and the spread of foodborne illnesses. GMP guidelines require that food production facilities implement a sanitation program that includes regular monitoring and verification activities to ensure that the facilities are maintained in a clean and hygienic state. This helps to prevent the growth of harmful microorganisms and reduces the risk of cross-contamination between different food products.

GMP and sanitation control are integral components of ensuring the safety and quality of food products. While GMP provides the overall framework for food production and handling, sanitation control is a critical component of GMP that helps to minimize the risk of food contamination and the spread of foodborne illnesses. Both GMP and sanitation control must be followed in order to produce safe, wholesome and high-quality food products.

GMP regarding personnel

The management of the seafood processing industry must take reasonable measures and precautions to ensure the following:

Personnel Requirements-

- *Personnel should be trained and qualified for their job responsibilities;*
- *Personnel should follow good hygiene practices, including hand washing and wearing appropriate personal protective equipment (PPE);*
- *Personnel should be familiar with and follow the standard operating procedures (SOPs);*
- *Personnel should avoid actions that may cause contamination of products, including not reporting to work if feeling unwell;*
- *Personnel should report any deviations from SOPs or product specifications to a supervisor;*
- *Personnel should be made aware of the importance of their role in maintaining product quality and safety;*
- *Personnel should be free from illness, open lesion, including boils, sores, or infected wounds, or any other abnormal source of microbial contamination.*

Disease control: Any person who, by medical examination or supervisory observation, is shown to have, or appears to have, an illness, open lesion, including boils, sores, or infected wounds, or any other abnormal source of microbial contamination by which there is a reasonable possibility of food, food-contact surfaces, or food-packaging materials becoming contaminated, must be excluded from any operations which may be expected to result in such contamination until the condition is corrected, unless conditions such as open lesions, boils, and infected wounds are adequately covered (e.g., by an impermeable cover). Personnel must be instructed to report such health conditions to their supervisors.

Cleanliness: All persons working in direct contact with food, food-contact surfaces, and food-packaging materials must conform to hygienic practices while on duty to the extent necessary to protect against allergen cross-contact and against contamination of food. The methods for maintaining cleanliness include:

- Wearing outer garments suitable to the operation in a manner that protects against allergen cross-contact and against the contamination of food, food-contact surfaces, or food-packaging materials.
- Maintaining adequate personal cleanliness.
- Washing hands thoroughly (and sanitizing if necessary to protect against contamination with undesirable microorganisms) in an adequate hand-washing facility before starting work, after each absence from the work station, and at any other time when the hands may have become soiled or contaminated.

- Removing all unsecured jewelry and other objects that might fall into food, equipment, or containers, and removing hand jewelry that cannot be adequately sanitized during periods in which food is manipulated by hand. If such hand jewelry cannot be removed, it may be covered by material which can be maintained in an intact, clean, and sanitary condition and which effectively protects against the contamination by these objects of the food, food-contact surfaces, or food-packaging materials.
- Maintaining gloves, if they are used in food handling, in an intact, clean, and sanitary condition.
- Wearing, where appropriate, in an effective manner, hair nets, headbands, caps, beard covers, or other effective hair restraints.
- Storing clothing or other personal belongings in areas other than where food is exposed or where equipment or utensils are washed.
- Confining the following to areas other than where food may be exposed or where equipment or utensils are washed: eating food, chewing gum, drinking beverages, or using tobacco.
- Taking any other necessary precautions to protect against allergen cross-contact and against contamination of food, food-contact surfaces, or food-packaging materials with microorganisms or foreign substances (including perspiration, hair, cosmetics, tobacco, chemicals, and medicines applied to the skin).

GMP regarding plant and grounds

Grounds - The grounds about a food plant under the control of the operator must be kept in a condition that will protect against the contamination of food. The methods for adequate maintenance of grounds must include:

- Properly storing equipment, removing litter and waste, and cutting weeds or grass within the immediate vicinity of the plant that may constitute an attractant, breeding place, or harborage for pests.
- Maintaining roads, yards, and parking lots so that they do not constitute a source of contamination in areas where food is exposed.
- Adequately draining areas that may contribute contamination to food by seepage, foot-borne filth, or providing a breeding place for pests.
- Operating systems for waste treatment and disposal in an adequate manner so that they do not constitute a source of contamination in areas where food is exposed.
- If the plant grounds are bordered by grounds not under the operator's control and not maintained, care must be exercised in the plant by inspection, extermination, or other means to exclude pests, dirt, and filth that may be a source of food contamination.

Plant construction and design: The plant must be suitable in size, construction, and design to facilitate maintenance and sanitary operations for food-production purposes (i.e., manufacturing, processing, packing, and holding). The plant must:

- Provide adequate space for such placement of equipment and storage of materials as is necessary for maintenance, sanitary operations, and the production of safe food.
- Permit the taking of adequate precautions to reduce the potential for allergen cross-contact and for contamination of food, food-contact surfaces, or food-packaging materials with microorganisms, chemicals, filth, and other extraneous material. The potential for allergen cross-contact and for contamination may be reduced by adequate food safety controls and operating practices or effective design, including the separation of operations in which allergen cross-contact and contamination are likely to occur, by one or more of the following means: location, time, partition, air flow systems, dust control systems, enclosed systems, or other effective means.
- Permit the taking of adequate precautions to protect food in installed outdoor bulk vessels by any effective means, including:
 - Using protective coverings.
 - Controlling areas over and around the vessels to eliminate harborage for pests.
 - Checking on a regular basis for pests and pest infestation.
 - Skimming fermentation vessels, as necessary.

- Be constructed in such a manner that floors, walls, and ceilings may be adequately cleaned and kept clean and kept in good repair; that drip or condensate from fixtures, ducts and pipes does not contaminate food, food-contact surfaces, or food-packaging materials; and that aisles or working spaces are provided between equipment and walls and are adequately unobstructed and of adequate width to permit employees to perform their duties and to protect against contaminating food, food-contact surfaces, or food-packaging materials with clothing or personal contact.
- Provide adequate lighting in hand-washing areas, dressing and locker rooms, and toilet rooms and in all areas where food is examined, manufactured, processed, packed, or held and where equipment or utensils are cleaned; and provide shatter-resistant light bulbs, fixtures, skylights, or other glass suspended over exposed food in any step of preparation or otherwise protect against food contamination in case of glass breakage.
- Provide adequate ventilation or control equipment to minimize dust, odors and vapors (including steam and noxious fumes) in areas where they may cause allergen cross-contact or contaminate food; and locate and operate fans and other air-blowing equipment in a manner that minimizes the potential for allergen cross-contact and for contaminating food, food-packaging materials, and food-contact surfaces.
- Provide, where necessary, adequate screening or other protection against pests

GMP regarding sanitary operations

General maintenance - Buildings, fixtures, and other physical facilities of the plant must be maintained in a clean and sanitary condition and must be kept in repair adequate to prevent food from becoming adulterated. Cleaning and sanitizing of utensils and equipment must be conducted in a manner that protects against allergen cross-contact and against contamination of food, food-contact surfaces, or food-packaging materials.

Substances used in cleaning and sanitizing; storage of toxic materials

- Cleaning compounds and sanitizing agents used in cleaning and sanitizing procedures must be free from undesirable microorganisms and must be safe and adequate under the conditions of use. Compliance with this requirement must be verified by any effective means, including purchase of these substances under a letter of guarantee or certification or examination of these substances for contamination. Only the following toxic materials may be used or stored in a plant where food is processed or exposed:
 - Those required to maintain clean and sanitary conditions;
 - Those necessary for use in laboratory testing procedures;
 - Those necessary for plant and equipment maintenance and operation; and
 - Those necessary for use in the plant's operations.
- Toxic cleaning compounds, sanitizing agents, and pesticide chemicals must be identified, held, and stored in a manner that protects against contamination of food, food-contact surfaces, or food-packaging materials.

Sanitation operations such as -

- *Regular cleaning and sanitizing of equipment and facilities;*
- *Proper hygiene practices among employees;*
- *Implementing effective pest control measures;*
- *Keeping records of sanitation practices to demonstrate compliance;*
- *Maintaining a hygienic environment to prevent product contamination;*
- *Ensuring products are free from contaminants that pose a risk to public health;*
- *Utensils and equipment cleaned and sanitized that protects allergen cross-contact;*
- *Cleaning compounds and sanitizing agents comply with requirements*
- *Properly and frequently clean & sanitize both food-contact and nonfood-contact surfaces.*

- Be constructed in such a manner that floors, walls, and ceilings may be adequately cleaned and kept clean and kept in good repair; that drip or condensate from fixtures, ducts and pipes does not contaminate food, food-contact surfaces, or food-packaging materials; and that aisles or working spaces are provided between equipment and walls and are adequately unobstructed and of adequate width to permit employees to perform their duties and to protect against contaminating food, food-contact surfaces, or food-packaging materials with clothing or personal contact.
- Provide adequate lighting in hand-washing areas, dressing and locker rooms, and toilet rooms and in all areas where food is examined, manufactured, processed, packed, or held and where equipment or utensils are cleaned; and provide shatter-resistant light bulbs, fixtures, skylights, or other glass suspended over exposed food in any step of preparation or otherwise protect against food contamination in case of glass breakage.
- Provide adequate ventilation or control equipment to minimize dust, odors and vapors (including steam and noxious fumes) in areas where they may cause allergen cross-contact or contaminate food; and locate and operate fans and other air-blowing equipment in a manner that minimizes the potential for allergen cross-contact and for contaminating food, food-packaging materials, and food-contact surfaces.
- Provide, where necessary, adequate screening or other protection against pests

Pest control: Pests must not be allowed in any area of a food plant. Guard, guide, or pest-detecting dogs may be allowed in some areas of a plant if the presence of the dogs is unlikely to result in contamination of food, food-contact surfaces, or food-packaging materials. Effective measures must be taken to exclude pests from the manufacturing, processing, packing, and holding areas and to protect against the contamination of food on the premises by pests. The use of pesticides to control pests in the plant is permitted only under precautions and restrictions that will protect against the contamination of food, food-contact surfaces, and food-packaging materials. Also other measures like light trap, rat trap, netting can be introduced to control pests. Every record should be well documented for further verification.

Sanitation of food-contact surface: All food-contact surfaces, including utensils and food-contact surfaces of equipment, must be cleaned as frequently as necessary to protect against allergen cross-contact and against contamination of food.

- Food-contact surfaces used for manufacturing/processing, packing, or holding low-moisture food must be in a clean, dry, sanitary condition before use. When the surfaces are wet-cleaned, they must, when necessary, be sanitized and thoroughly dried before subsequent use.
- In wet processing, when cleaning is necessary to protect against allergen cross-contact or the introduction of microorganisms into food, all food-contact surfaces must be cleaned and sanitized before use and after any interruption during which the food-contact surfaces may have become contaminated. Where equipment and utensils are used in a continuous production operation, the utensils and food-contact surfaces of the equipment must be cleaned and sanitized as necessary.
- Single-service articles (such as utensils intended for one-time use, paper cups, and paper towels) must be stored, handled, and disposed of in a manner that protects against allergen cross-contact and against contamination of food, food-contact surfaces, or food-packaging materials.

Sanitation of non-food-contact surfaced: non-food-contact surfaces of equipment used in the operation of a food plant must be cleaned in a manner and as frequently as necessary to protect against allergen cross-contact and against contamination of food, food-contact surfaces, and food-packaging materials.

Storage and handling of cleaned portable equipment and utensils: Cleaned and sanitized portable equipment with food-contact surfaces and utensils must be stored in a location and manner that protects food-contact surfaces from allergen cross-contact and from contamination.

Session Plan

Day: 01	Session: 1.5	Duration: 60 Minutes
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Session Title: GMP regarding Sanitary facilities & controls; Equipment & utensils

Learning objectives

At the end of this session, participants will be able to-

- Elucidate Good Manufacturing Practices (GMP) regarding-

Sanitary Facilities & Controls:

- Understanding of GMP requirements for facility design, construction, and maintenance
- Awareness of the importance of maintaining proper sanitation in the manufacturing environment
- Knowledge of measures to prevent contamination and cross-contamination
- Understanding of GMP requirements for cleaning and sanitizing facilities

Equipment & Utensils:

- Understanding of GMP requirements for equipment design, construction, and maintenance
- Awareness of the importance of proper cleaning and sanitizing equipment to prevent contamination
- Knowledge of procedures for verifying the cleanliness of equipment prior to use
- Understanding of the importance of maintaining equipment to ensure it operates properly and prevents contamination.

Warehousing & Distribution:

- Understanding of GMP requirements for storage and handling of products
- Awareness of the importance of proper labeling and identification of products to prevent mix-ups
- Knowledge of procedures for verifying the condition and identity of products prior to distribution

Holding & Distribution of By-Products:

- Understanding of GMP requirements for holding and distributing by-products
- Awareness of the importance of proper labeling and identification of by-products to prevent mix-ups
- Knowledge of procedures for verifying the identity and condition of by-products prior to distribution

Defect Action Levels:

- Understanding of GMP requirements for setting and maintaining defect action levels
- Awareness of the importance of controlling defects in the manufacturing process
- Knowledge of procedures for handling products that exceed the defect action levels.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, white board, markers, sound system and handouts.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	GMP regarding sanitary facilities & controls	Check participants' understanding about sanitary facilities & controls through question and answer. Now present and discuss topic using PPT slides and the attached hand-out.	20 Minutes
Step-3	GMP regarding equipment & utensils	Check their understanding about equipment & utensils GMP important in seafood processing through question and answer. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	GMP regarding warehousing & distribution; holding & distribution of by-products and defect action levels	Check participants understanding about the topic through question and answer. Now present the each of the topic items using PPT slides and attached hand-out. Check participants understanding about the topic through question and answer. Now present the each of the topic items using PPT slides and attached hand-out.	15 Minutes
Step-5	Summary and Evaluation	Check participants understanding about the topic through question and answer. Now present the each of the topic items using PPT slides and attached hand-out.	15 Minutes

GMP regarding Sanitary facilities & controls, Equipment & Utensils

1. Sanitary facilities and controls

Each plant must be equipped with adequate sanitary facilities and accommodations including:

Water supply - The water supply must be adequate for the operations intended and must be derived from an adequate source. Any water that contacts food, food-contact surfaces, or food-packaging materials must be safe and of adequate sanitary quality. Running water at a suitable temperature, and under pressure as needed, must be provided in all areas where required for the processing of food, for the cleaning of equipment, utensils, and food-packaging materials, or for employee sanitary facilities.

Plumbing - Plumbing must be of adequate size and design and adequately installed and maintained to:

- Carry adequate quantities of water to required locations throughout the plant.
- Properly convey sewage and liquid disposable waste from the plant.
- Avoid constituting a source of contamination to food, water supplies, equipment, or utensils or creating an unsanitary condition.
- Provide adequate floor drainage in all areas where floors are subject to flooding-type cleaning or where normal operations release or discharge water or other liquid waste on the floor.
- Provide that there is not backflow from, or cross-connection between, piping systems that discharge waste water or sewage and piping systems that carry water for food or food manufacturing.

Sanitary facilities and accommodations -

- *water supply;*
- *plumbing;*
- *sewage disposal;*
- *toilet facilities;*
- *hand-washing facilities;*
- *rubbish and offal disposal*

Sewage disposal - Sewage must be disposed of into an adequate sewerage system or disposed of through other adequate means.

Toilet facilities - Each plant must provide employees with adequate, readily accessible toilet facilities. Toilet facilities must be kept clean and must not be a potential source of contamination of food, food-contact surfaces, or food-packaging materials.

Hand-washing facilities - Each plant must provide hand-washing facilities designed to ensure that an employee's hands are not a source of contamination of food, food-contact surfaces, or food-packaging materials, by providing facilities that are adequate, convenient, and furnish running water at a suitable temperature.

Rubbish and offal disposal - Rubbish and any offal must be so conveyed, stored, and disposed of as to minimize the development of odor, minimize the potential for the waste becoming an attractant and harborage or breeding place for pests, and protect against contamination of food, food-contact surfaces, food-packaging materials, water supplies, and ground surfaces.

2. Equipment and utensils

- All plant equipment and utensils used in manufacturing, processing, packing, or holding food must be so designed and of such material and workmanship as to be adequately cleanable, and must be adequately maintained to protect against allergen cross-contact and contamination.
- Equipment and utensils must be designed, constructed, and used appropriately to avoid the adulteration of food with lubricants, fuel, metal fragments, contaminated water, or any other contaminants.

Equipment and utensils must be -

- *cleanable and maintained to protect against allergen, cross-contact and contamination;*
- *used appropriately to avoid adulteration;*
- *installed so as to facilitate cleaning and maintenance;*
- *corrosion-resistant.*

- Equipment must be installed so as to facilitate the cleaning and maintenance of the equipment and of adjacent spaces.
- Food-contact surfaces must be corrosion-resistant when in contact with food.
- Food-contact surfaces must be made of nontoxic materials and designed to withstand the environment of their intended use and the action of food, and, if applicable, cleaning compounds, sanitizing agents, and cleaning procedures.
- Food-contact surfaces must be maintained to protect food from allergen cross-contact and from being contaminated by any source, including unlawful indirect food additives.
- Seams on food-contact surfaces must be smoothly bonded or maintained so as to minimize accumulation of food particles, dirt, and organic matter and thus minimize the opportunity for growth of microorganisms and allergen cross-contact.
- Equipment that is in areas where food is manufactured, processed, packed, or held and that does not come into contact with food must be so constructed that it can be kept in a clean and sanitary condition.
- Holding, conveying, and manufacturing systems, including gravimetric, pneumatic, closed, and automated systems, must be of a design and construction that enables them to be maintained in an appropriate clean and sanitary condition.
- Each freezer and cold storage compartment used to store and hold food capable of supporting growth of microorganisms must be fitted with an indicating thermometer, temperature-measuring device, or temperature-recording device so installed as to show the temperature accurately within the compartment.
- Instruments and controls used for measuring, regulating, or recording temperatures, pH, acidity, water activity, or other conditions that control or prevent the growth of undesirable microorganisms in food must be accurate and precise and adequately maintained, and adequate in number for their designated uses.
- Compressed air or other gases mechanically introduced into food or used to clean food-contact surfaces or equipment must be treated in such a way that food is not contaminated with unlawful indirect food additives.

3. Warehousing and distribution

Storage and transportation of food must be under conditions that will protect against allergen cross-contact and against biological, chemical (including radiological), and physical contamination of food, as well as against deterioration of the food and the container. For the operation of a warehouse and distribution activities rules 6 and 15 and schedule 11 of "Fish and fishery products (Inspection and Quality Control) Rules 2021 (Draft)", should be taken in consideration.

4. Holding and distribution of by-products

By-products -

- *held under conditions that will protect against contamination*
- *held for distribution as animal food without additional processing*
- *labelled in common or usual name*
- *examined prior to ship to protect against contamination*

(a) Seafood by-products held for distribution as animal food without additional manufacturing or processing by the processor, must be held under conditions that will protect against contamination, including the following:

(1) Containers and equipment used to convey or hold seafood by-products for use as animal food before distribution must be designed, constructed of appropriate material, cleaned as necessary, and maintained to protect against the contamination of seafood by-products for use as animal food;

For the holding and distribution of by-products, GMP requires that all by-products be stored in a manner that prevents contamination, deterioration, or mix-up with other materials. This includes proper labelling and segregation of by-products. The distribution of by-products must also be controlled to ensure that they are not used for purposes for which they are not intended.

(2) Seafood by-products for use as animal food held for distribution must be held in a way to protect against contamination from sources such as trash; and

(3) During holding, seafood by-products for use as animal food must be accurately identified.

(b) Labeling that identifies the by-product by the common or usual name must be affixed to or accompany seafood by-products for use as animal food when distributed.

(c) Shipping containers (e.g., totes, drums, and tubs) and bulk vehicles used to distribute seafood by-products for use as animal food must be examined prior to use to protect against contamination of the seafood by-products for use as animal food from the container or vehicle when the facility is responsible for transporting the seafood by-products for use as animal food itself or arranges with a third party to transport the seafood by-products for use as animal food.

5. Defect action levels

- The manufacturer, processor, packer, and holder of food must at all times utilize quality control operations that reduce natural or unavoidable defects to the lowest level currently feasible.
- The mixing of a food containing defects at levels that render that food adulterated with another lot of food is not permitted and renders the final food adulterated, regardless of the defect level of the final food.

Good Manufacturing Practices (GMP) regarding sanitary facilities and controls include regulations for setting and maintaining proper sanitation in the manufacturing process to ensure the production of safe and clean food, pharmaceuticals, and other products.

A "defect action level" refers to the maximum level of a defect that is considered acceptable in a product without posing a health risk to consumers. This level is established by regulatory agencies such as the FDA in the US, and deviations from it can result in product recalls or other enforcement actions.

For example, the FDA has established defect action levels for certain physical contaminants in food, such as rodent hairs in a specific amount of peanut butter, or insect fragments in a set amount of cinnamon. These levels serve as guidelines for manufacturers to follow in order to maintain the safety and quality of their products

Session Plan

Day: 01	Session: 1.6	Duration: 60 Minutes
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Session Title: GMP regarding Processes and controls.

Learning objectives

At the end of this session, participants will be able to-

- Understand GMP principles and requirements for product manufacturing;
- Be aware of the importance of controlling the manufacturing process to ensure consistent quality;
- Know GMP requirements for production records and documentation;
- Understand the importance of verifying the accuracy of production records and documentation;
- Be aware of the importance of controlling raw materials and packaging materials to prevent contamination;
- Know GMP requirements for process controls, including in-process testing and inspection;
- Understand the importance of monitoring and controlling the production environment, including temperature, humidity, and lighting;
- Be aware of the importance of proper storage and handling of finished products to maintain quality and prevent contamination.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, white board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	• Begin the session by welcoming the participants and connecting with the previous session. • Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed. Explanation of Good Manufacturing Practices, its importance, and its relevance to the manufacturing of fish and fishery products	4 Minutes
Step-2	Processes and controls	Check participants' understanding about GMP regarding processes and controls. Now present and discuss the topic using PPT slides and the attached hand-out.	50 Minutes
Step-3	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Good Manufacturing Practices (GMP)

Objective: To understand the requirements of GMP and the importance of adhering to them to ensure consistent product quality.

Duration: 1 Hour

Target audience: All employees involved in the manufacturing, packaging, and storage of products.

Training Methods:

1. **Lecture:** Provide an overview of the requirements of GMP, emphasizing the importance of adhering to them to ensure consistent product quality.
2. **Group Discussion:** Encourage employees to discuss the importance of GMP and how they can ensure that they comply with them.
3. **Case Study:** Present real-life examples of companies that have failed to adhere to GMP requirements, and discuss the impact of their actions on their products and customers.
4. **Q&A:** Address any questions or concerns employees may have about GMP requirements and how they can ensure that they comply with them.

Session Plan:

1. **Introduction (5 minutes)**
 - Introduce the topic of GMP and explain its importance in ensuring consistent product quality.
 - Explain the objectives of the training session and what employees can expect to learn.
2. **Overview of GMP (15 minutes)**
 - Provide an overview of the requirements of GMP, including the need for validation and review of processes and controls, monitoring and control of critical parameters, and documentation of all changes.
 - Discuss how GMP ensures the safety and effectiveness of products manufactured under its conditions.
3. **Group Discussion (20 minutes)**
 - Encourage employees to discuss the importance of GMP and how they can ensure that they comply with them.
 - Discuss common challenges that employees may face when adhering to GMP requirements and how to overcome them.
 - Provide examples of situations where employees may have to make decisions that impact GMP compliance, and discuss the best course of action in such situations.
4. **Case Study (15 minutes)**
 - Present a case study of a company that failed to adhere to GMP requirements, and discuss the impact of their actions on their products and customers.
 - Encourage employees to discuss how the situation could have been prevented, and what steps they would take to avoid a similar situation in their workplace.
5. **Q&A (5 minutes)**
 - Address any questions or concerns employees may have about GMP requirements and how they can ensure that they comply with them.
 - Provide additional resources and support as needed.
6. **Conclusion (5 minutes)**
 - Summarize the key takeaways from the training session.
 - Encourage employees to apply what they have learned to their work and to maintain a commitment to GMP compliance.

Training Session Plan: GMP regarding Processes and Controls

Objective: To provide an understanding of Good Manufacturing Practices (GMP), processes, and controls, and the importance of their validation, review, monitoring, and documentation in ensuring that products are of consistent quality and meet required specifications.

Duration: 2 hours

Materials Needed: Presentation slides, whiteboard, markers, handouts, case studies, and assessment tools.

Session Plan:

I. Introduction (15 minutes)

- Welcome and introduction of trainer
- Overview of the training session objectives and goals
- Explanation of GMP, its importance, and its relevance to the manufacturing of fish and fish products.

II. GMP Principles (30 minutes)

- Explanation of GMP principles related to processes and controls, sanitation, quality control, contamination, and product rejection
- Discussion of case studies illustrating GMP principles.

III. Processes and Controls (30 minutes)

- Explanation of the validation, review, monitoring, and documentation of processes and controls.
- Discussion of the importance of systematic and consistent monitoring and control of processes and critical parameters.
- Explanation of the validation and documentation of changes to processes or controls and their impact on product quality.
- Discussion of case studies illustrating processes and controls.

IV. Raw Materials and Ingredients (30 minutes)

- Explanation of the inspection, segregation, handling, and storage of raw materials and other ingredients.
- Discussion of the washing or cleaning of raw materials to remove soil or other contamination.
- Explanation of the susceptibility to contamination with natural toxins or pests and the FDA regulations for such.
- Discussion of case studies illustrating raw materials and ingredients.

V. Manufacturing Operations (30 minutes)

- Explanation of the maintenance of equipment, utensils, and food containers.
- Discussion of the conditions and controls necessary to minimize the growth of microorganisms, allergen cross-contact, contamination, and deterioration of food.
- Explanation of measures taken to prevent food from being adulterated, such as sterilizing, pasteurizing, cooking, or refrigerating.
- Discussion of case studies illustrating manufacturing operations.

VI. Conclusion (15 minutes)

- Review of the GMP principles, processes and controls, raw materials and ingredients, and manufacturing operations covered in the session.
- Summary of the key points and takeaways from the session.
- Assessment of learning through quizzes or open discussion.
- Q&A.

Overall, this session will help participants gain a thorough understanding of GMP, processes and controls, and the importance of their validation, review, monitoring, and documentation in ensuring that products are of consistent quality and meet required specifications

GMP regarding Processes and Controls

Good Manufacturing Practices (GMP) require that all processes and controls be validated and regularly reviewed to ensure that the products being produced are of consistent quality and meet the required specifications. This includes processes for the production, packaging, and storage of products. GMP also requires that all process controls and critical parameters be monitored, recorded, and reviewed to ensure that they are within the established limits. The monitoring and control of processes must be performed in a systematic and consistent manner to ensure that deviations from established standards are detected and corrected promptly. Additionally, GMP requires that all changes to processes or controls be validated and fully documented to ensure that their impact on product quality is understood. This helps to ensure that all products manufactured under GMP conditions are safe and effective for their intended use.

In general-

- All operations in the processing of fish and fish products must be conducted in accordance with adequate sanitation principles.
- Appropriate quality control operations must be employed to ensure that the product is suitable for human consumption.
- Overall sanitation of the plant must be under the supervision of assigned individuals.
- Adequate precautions must be taken to ensure that production procedures do not contribute to allergen cross-contact and to contamination from any source.
- Chemical, microbial, or extraneous-material testing procedures must be used.
- All food that has become contaminated must be rejected, or treated or reprocessed.

Raw materials and other ingredients

- Raw materials and other ingredients must be inspected and segregated or otherwise handled as necessary to ascertain that they are clean and suitable for processing into food and must be stored under conditions that will protect against allergen cross-contact and against contamination and minimize deterioration. Raw materials must be washed or cleaned as necessary to remove soil or other contamination. Water used for washing, rinsing, or conveying food must be safe and of adequate sanitary quality. Water may be reused for washing, rinsing, or conveying food if it does not cause allergen cross-contact or increase the level of contamination of the food.
- Raw materials and other ingredients must either not contain levels of microorganisms that may render the food injurious to the health of humans, or they must be pasteurized or otherwise treated during manufacturing operations so that they no longer contain levels that would cause the product to be adulterated

Raw materials and other ingredients must be -

- *inspected and segregated or otherwise handled to minimize contamination*
- *washed or cleaned as necessary to remove soil or other contamination*
- *free from microorganisms or otherwise treated to remove adulteration*
- *free from aflatoxin or another natural toxin*
- *held in bulk or in containers*

- Raw materials and other ingredients susceptible to contamination with aflatoxin or other natural toxins must comply with FDA regulations for poisonous or deleterious substances before these raw materials or other ingredients are incorporated into finished food.
- Raw materials, other ingredients, and rework susceptible to contamination with pests, undesirable microorganisms, or extraneous material must comply with applicable FDA regulations for natural or unavoidable defects if a manufacturer wishes to use the materials in manufacturing food.

- Raw materials and other ingredients susceptible to contamination with aflatoxin or other natural toxins must comply with FDA regulations for poisonous or deleterious substances before these raw materials or other ingredients are incorporated into finished food.
- Raw materials, other ingredients, and rework susceptible to contamination with pests, undesirable microorganisms, or extraneous material must comply with applicable FDA regulations for natural or unavoidable defects if a manufacturer wishes to use the materials in manufacturing food.
- Raw materials, other ingredients, and rework must be held in bulk, or in containers designed and constructed so as to protect against allergen cross-contact and against contamination and must be held at such temperature and relative humidity and in such a manner as to prevent the food from becoming adulterated. Material scheduled for rework must be identified as such.

Good Manufacturing Practices (GMP) regarding processes and controls for raw materials and other ingredients include guidelines for ensuring the quality and safety of these components before they are used in the manufacturing process.

These guidelines generally include requirements for supplier qualification, ingredient testing and inspection, storage, and handling of raw materials and other ingredients. The goal is to prevent contamination or other issues that could affect the safety and quality of the final product.

For example, GMP guidelines may require that suppliers provide documentation and testing results for raw materials, such as certificates of analysis, to confirm their composition and purity. Raw materials may also be subject to physical and chemical tests, such as metal detection and microbial analysis, to verify their suitability for use. Proper storage and handling procedures, such as temperature control and segregation of raw materials, can also help to minimize the risk of contamination or spoilage.

By following GMP guidelines for raw materials and other ingredients, manufacturers can help to ensure the safety, quality, and consistency of their products.

- Frozen raw materials and other ingredients must be kept frozen. If thawing is required prior to use, it must be done in a manner that prevents the raw materials and other ingredients from becoming adulterated.
- Liquid or dry raw materials and other ingredients received and stored in bulk form must be held in a manner that protects against allergen cross-contact and against contamination.
- Raw materials and other ingredients that are food allergens, and rework that contains food allergens, must be identified and held in a manner that prevents allergen cross-contact.

Manufacturing operations

- Equipment and utensils and food containers must be maintained in an adequate condition through appropriate cleaning and sanitizing, as necessary. In so far as necessary, equipment must be taken apart for thorough cleaning.
- All food manufacturing, processing, packing, and holding must be conducted under such conditions and controls as are necessary to minimize the potential for the growth of microorganisms, allergen cross-contact, contamination of food, and deterioration of food.
- Food that can support the rapid growth of undesirable microorganisms must be held at temperatures that will prevent the food from becoming adulterated during manufacturing, processing, packing, and holding.
- Measures such as sterilizing, irradiating, pasteurizing, cooking, freezing, refrigerating, controlling pH, or controlling aw that are taken to destroy or prevent the growth of undesirable microorganisms must be adequate under the conditions of manufacture, handling, and distribution to prevent food from being adulterated.

- Work-in-process and rework must be handled in a manner that protects against allergen cross-contact, contamination, and growth of undesirable microorganisms.
- Effective measures must be taken to protect finished food from allergen cross-contact and from contamination by raw materials, other ingredients, or refuse. When raw materials, other ingredients, or refuse are unprotected, they must not be handled simultaneously in a receiving, loading, or shipping area if that handling could result in allergen cross-contact or contaminated food. Food transported by conveyor must be protected against allergen cross-contact and against contamination as necessary.
- Equipment, containers, and utensils used to convey, hold, or store raw materials and other ingredients, work-in-process, rework, or other food must be constructed, handled, and maintained during manufacturing, processing, packing, and holding in a manner that protects against allergen cross-contact and against contamination.
- Adequate measures must be taken to protect against the inclusion of metal or other extraneous material in food.

Good Manufacturing Practices (GMP) requires that all manufacturing operations be performed in accordance with a well-defined and documented process. This includes the use of written procedures that outline the steps to be followed in the production, packaging, and storage of products. GMP also requires that all manufacturing operations be performed by trained personnel using validated equipment and facilities.

In addition, GMP requires that all manufacturing operations be performed under controlled conditions to ensure that the quality of the products is not compromised. This includes monitoring and controlling the environment, such as temperature, humidity, and lighting, as well as monitoring and controlling the process itself, such as the speed, pressure, and time of production. GMP also requires that all raw materials and intermediate products be tested and approved before use, and that all finished products be tested to ensure that they meet the required specifications.

Finally, GMP requires that all manufacturing operations be subject to regular review and evaluation to ensure that they are being performed in a consistent and effective manner, and that they are continuously improved to meet changing requirements. This helps to ensure that all products manufactured under GMP conditions are of the highest quality and that they are safe and effective for their intended use.

- Food, raw materials, and other ingredients that are adulterated:
 - Must be disposed of in a manner that protects against the contamination of other food; or
 - If the adulterated food is capable of being reconditioned, it must be:
 - (A) Reconditioned (if appropriate) using a method that has been proven to be effective; or
 - (B) Reconditioned (if appropriate) and reexamined and subsequently found not to be adulterated within the meaning of the Federal Food, Drug, and Cosmetic Act before being incorporated into other food.
- Steps such as washing, peeling, trimming, cutting, sorting and inspecting, mashing, dewatering, cooling, shredding, extruding, drying, whipping, defatting, and forming must be performed so as to protect food against allergen cross-contact and against contamination. Food must be protected from contaminants that may drip, drain, or be drawn into the food.
- Heat blanching, when required in the preparation of food capable of supporting microbial growth, must be effected by heating the food to the required temperature, holding it at this temperature for the required time, and then either rapidly cooling the food or passing it to subsequent manufacturing without delay. Growth and contamination by thermophilic microorganisms in blanchers must be minimized by the use of adequate operating temperatures and by periodic cleaning and sanitizing as necessary.

- Batters, breadings, sauces, gravies, dressings, dipping solutions, and other similar preparations that are held and used repeatedly over time must be treated or maintained in such a manner that they are protected against allergen cross-contact and against contamination, and minimizing the potential for the growth of undesirable microorganisms.
- Filling, assembling, packaging, and other operations must be performed in such a way that the food is protected against allergen cross-contact, contamination and growth of undesirable microorganisms.
- Food, such as dry mixes, nuts, intermediate moisture food, and dehydrated food, that relies principally on the control of water activity (aw) for preventing the growth of undesirable microorganisms must be processed to and maintained at a safe moisture level.
- Food, such as acid and acidified food, that relies principally on the control of pH for preventing the growth of undesirable microorganisms must be monitored and maintained at a pH of 4.6 or below. When ice is used in contact with food, it must be made from water that is safe and of adequate sanitary quality and must be used only if it has been manufactured in accordance with good manufacturing practice as outlined in this part.

Good Manufacturing Practices (GMP) regarding processes and controls for manufacturing operations include guidelines for ensuring the proper execution of the manufacturing process to produce safe and high-quality products.

These guidelines may cover various aspects of the manufacturing process, including equipment and facilities design and maintenance, employee training and hygiene, and product testing and inspection. The goal is to minimize the risk of contamination, errors, or other issues that could impact the safety, efficacy, or quality of the final product.

For example, GMP guidelines may require that manufacturing equipment be designed and constructed to minimize the risk of contamination and be regularly cleaned and maintained to ensure optimal performance. Employee training programs may be required to ensure that workers understand the importance of proper hygiene and follow established procedures to prevent contamination.

Product testing and inspection procedures may also be established to verify that products meet the required specifications, such as for purity, potency, and appearance. Deviations from established specifications can trigger a review of the manufacturing process and corrective action as needed.

By following GMP guidelines for manufacturing operations, manufacturers can help to ensure the safety, quality, and consistency of their products and comply with regulatory requirements.

Session Plan

Day: 02	Session: 2.1	Duration: 30 Minutes
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Session Title: Review and feedback of previous day's learning

Learning objectives

At the end of this session, participants will be able to:

- Review the previous day's learning and provide feedback;
- Recall their previous discussions and revise and enhance the learnings from the sessions.
- Review the previous day's learning to correct slip-ups and achieve a consensus

Methodology: Discussion and Q&A

Materials: Board, markers, sound system

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	▪ Warm-up activities. ▪ Connecting to the current session.	4 Minutes
Step-2	Content	▪ Review of previous day's activities by a trainee. ▪ All participants feedback on topics discussed on the previous day.	20 Minutes
Step-3	Summary	▪ Connecting to the next session. ▪ Feedback on participant's discussion with thanking everyone.	6 Minutes

Session Plan

Day: 02	Session: 2.2	Duration: 60 Minutes
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Session Title: Good hygiene practices in processing of fishery products

Learning objectives

At the end of this session, participants will be able to-

- Have a basic understanding of the importance of food safety and hygiene in the processing of fishery products;
- Identify and understand the key principles and practices of good hygiene in the processing of fishery products;
- Implement hygiene procedures, such as hand washing, cleaning and sanitizing equipment, and maintaining good personal hygiene, in their daily processing activities;
- Recognize potential hygiene hazards in the processing environment and take appropriate measures to control them;
- Understand and comply with relevant food safety and hygiene regulations in the processing of fishery products;
- Develop and apply GHP for an establishment.

By achieving these objectives, participants will be able to improve their hygiene practices in processing operations, leading to a safer and higher-quality product.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, white board, markers, sound system and handouts.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed. Warm-up Activity	4 Minutes
Step-2	GHP regarding Establishment and control of operation	Check participants' understanding about GHP regarding establishment and control of operation through question and answer. Now present and discuss the topic using PPT slides and the attached hand-out.	15 Minutes
Step-3	GHP regarding maintenance and sanitation	Check their understanding about maintenance and sanitation. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	GHP regarding personal hygiene, product storage, document, record keeping & training	Check participants understanding why personal hygiene, product storage, documentation and record keeping is required. Now give the participants a short overview about the topics using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Warm-up Activity

Title: Fishery Hygiene Relay

Objective: To reinforce the importance of good hygiene practices in the processing of fishery products.

Materials needed: A stopwatch or timer, a list of good hygiene practices in fishery processing (written or projected), and a designated start and finish line.

Instructions:

1. Divide the participants into two teams.
2. Assign each team a starting point at the designated start line.
3. Explain that each team will take turns racing to the finish line, but they must complete a task related to good hygiene practices in fishery processing before they can hand off to the next person in line.
4. Project or read out a list of good hygiene practices in fishery processing, such as cleaning and sanitizing equipment, washing hands frequently, and using gloves and hairnets.
5. The first person in each team will race to the finish line, grab a marker or pen, and write down one of the hygiene practices on a board or flipchart.
6. Once they've written down the practice, they must race back to their team and tag the next person in line.
7. The next person in line must then race to the board, find a hygiene practice that hasn't been written down yet, write it down, and race back to tag the next person in line.
8. The relay continues until each member of the team has completed the race and added a hygiene practice to the board.
9. The first team to complete the race and write down all the hygiene practices wins.

Discussion:

After the relay, facilitate a discussion with the participants about the importance of good hygiene practices in fishery processing. Use the following questions to guide the discussion:

1. What are some of the most important hygiene practices in fishery processing?
2. Why is it important to follow these hygiene practices?
3. What are some consequences of not following good hygiene practices in fishery processing?
4. How can you ensure that you and your team are following good hygiene practices in fishery processing?

By using this energizer, the participants will be able to reinforce the importance of good hygiene practices in fishery processing in a fun and interactive way.

Good Hygiene Practices in Processing of Fishery Products

Fishery products processors need to be aware of hazards that may affect their products. Fishery products processors need to understand the consequences of these hazards for consumer health and should ensure that they are properly managed. Good Hygiene Practices (GHP) are the foundation of any effective control of hazards associated with their products. For some products effective implementation of GHP will be sufficient to address food safety.

The sufficiency of the implemented GHP to address food safety could be determined through conducting a hazard analysis and determining how to control identified hazards. If the processor is not able to conduct a hazard analysis, he/she may rely on information on appropriate food safety practices from external sources such as that provided by competent authorities, academia or other competent bodies (e.g. trade associations or professional societies) that has been based on the identification of relevant hazards and controls.

All GHP are important but some GHP have a greater impact on food safety. Thus, for some GHP, based on safety concerns with the food, greater attention may be needed to provide safe food. Greater attention may include a higher frequency of application, of monitoring and of verification. In some circumstances, the implementation of GHP may not be sufficient to ensure food safety due to the complexity of the food operation and/or specific hazards associated with the product or process, technological advances (e.g. extending shelf-life through modified atmosphere packaging) or end use of the product (e.g. products destined for a special dietary purpose). In such cases, when there are significant hazards identified through hazard analysis as not being controlled by GHP, they should be addressed in the HACCP plan.

GHP- Fundamental measures and conditions applied at any step within the food chain to provide safe and suitable food. GHP covers a range of measures aimed at preventing contamination and ensuring the wholesomeness of seafood products. Some examples of GHP in fishery product processing include:

- Personnel hygiene;
- Sanitation of facilities and equipment;
- Proper storage;
- Traceability;
- HACCP (Hazard Analysis and Critical Control Points) program.

By following good hygiene practices in the processing of fishery products, processors can help to ensure that seafood products are safe, wholesome, and of high quality for consumption.

1. Establishment

1.1 Location

- Establishment shall not be located in an area that poses environmental risk of contamination to the products such as a polluted industrial area, flooded area, and heavily air polluted area. If it is unavoidably located in an area likely to cause contamination, appropriate control measure shall be in place.

GHP- Fundamental measures and conditions applied at any step within the food chain to pAn establishment is an organization occupying a particular building or place. It may be fish processing plant, fish landing center, fish depot, fish auction center, etc.

- Surrounding area of the establishment shall be clear, clean, free from rubbish and surplus materials and tall grass which could be the harbouring places of rodents, insects and other disease carrier animals.

1.2 Design

- Layout and processing line shall enhance good hygienic practices
 - Sufficient space in processing room shall be provided for placement of equipment and tools in order to enable easy cleaning. Processing areas shall be properly designed according to the process flow so as to prevent contaminations from microorganisms, chemicals, and foreign matters.
 - Unclean areas such as raw material receiving and pre-processing such as receiving, de-heading, gutting, etc. shall be separated from the clean areas. If different products are processed in the same area such as shrimp, cephalopods, fish, each production shall be clearly separated. In the production step, such cleaned products should be segregated from the unclean products.
 - In production of cooked product, the layout shall be properly designed by clearly separating post-cooking area from pre-cooking area in order to prevent microbiological cross contamination from raw to cooked products.
 - Establishment shall be located separately from housing areas without direct connection, except when there are appropriate measures to prevent product contamination in place.
- Floors of the processing area shall be made of durable materials, easy to maintain, smooth surface, non-slippery, non-absorbent, without crack and in good condition. Floors shall be slightly sloped to allow adequate draining.
- Ceiling and walls of the processing area (including tools and plumbing system installed in the area) shall be made of easy-to-clean material, smooth, non-absorbent, light coloured and in good condition in order to prevent mould. Ceiling in the processing area shall be able to prevent foreign matters such as spider webs, dusts, rust from overhead metal fixtures and plumbing, falling into the products. Plumbing system such as water and steam pipes should be designed to hide above the ceiling. If these systems are installed underneath the ceiling, pipes shall be clean without steam condensation.
- Drains in the processing area, in particular where excessive use of water is required, should be adequate in number and size with appropriate slope, good drainage, without causing water standing or overflow. Due to the significant amount of water used in the pre-processing of fishery products, appropriate design of the drainage system will accelerate water removing.

Good Hygiene Practices (GHP) in the processing of fishery products also includes design considerations to ensure the proper layout and construction of processing facilities, equipment, and other infrastructure. The design should promote hygienic conditions and facilitate effective cleaning and sanitizing to prevent contamination of seafood products.

Some design considerations for GHP in the processing of fishery products include:

- *Flow of products: The flow of products through the processing facility should be designed to minimize the risk of cross-contamination. For example, raw seafood products should be kept separate from cooked or ready-to-eat products.*
- *Layout and construction of facilities: Processing facilities should be designed and constructed using materials that are easy to clean and maintain, such as stainless steel and concrete. The facilities should also have proper drainage systems and be well-lit to facilitate cleaning and sanitation.*
- *Equipment design: Equipment used in the processing of seafood products should be designed to minimize the risk of contamination and be easy to clean and sanitize. Equipment should also be located in a manner that facilitates effective cleaning and sanitation.*
- *Lighting: Adequate lighting should be provided in processing areas to ensure that workers can effectively clean and sanitize facilities and equipment, and to allow for the visual inspection of seafood products.*

By considering these design elements in the processing of fishery products, processors can help to ensure that seafood products are produced in a hygienic environment and are safe and of high quality for consumption.

- Processing area should have good ventilation to exhaust odour, smoke, steam and heat which are resulted from processing activities. Poor ventilation will cause water condensation from steam which may contaminate the product. Steam generated from product cooking, once condensed will be a good source for microbial growth.
- Lighting should be adequate in the processing areas such as shrimp de-shelling and deveining, cephalopod skin cleaning, raw material washing, etc. to reduce the amount of defected product and ensure that the physical contamination is visible, particularly during washing or sorting out filth or foreign matters in raw materials.
 - General working areas should have a minimum light intensity of 220 lx, and at least 540 lx at sorting areas.
 - Light bulbs suspended over the working areas shall be covered and the covers shall be maintained their cleanliness. In case of light bulb dropping or breakage during work, the covers will prevent the broken glass from falling into the products and facilitate cleaning.
- Clothes changing facilities where workwear and personal belongings are stored shall be separated from the processing areas. The facilities should be kept clean and of good ventilation. Personal clothes should not be comingled with workwear.

1.3 Supplies, equipment and tools

- All supplies, equipment and tools used in the processing area directly or indirectly in contact with the product shall fit for purposes, easy to maintain with smooth surface, no cracking, non-absorbent and free of rust.
- Cleaned containers and tools shall be stored in an appropriate and clean place and not cause contamination such as good ventilation. Containers and tools shall be kept with enough space from the floor. Such containers and tools used inside the processing areas should not be stored outside that may cause contamination.

supplies, equipment, and tools in fishery product processing include:

- *Supplies: Supplies used in processing, such as packaging materials and cleaning chemicals, should be of food-grade quality and stored in a manner that minimizes the risk of contamination.*
- *Equipment: Equipment used in processing should be in good working order and maintained regularly to prevent contamination and ensure effective cleaning and sanitizing. Equipment should also be designed and constructed to minimize the risk of contamination and be easy to clean and sanitize.*
- *Tools: Tools used in processing, such as knives and cutting boards, should be clean and in good condition to prevent contamination and ensure the safety of seafood products. Tools should also be properly stored and cleaned between uses.*

2. Control of operation

2.1 Raw materials

- Raw material shall be clearly identified by lots. Lot identification shall be recorded and traceable to the source where necessary.
- Temperature of raw materials shall be monitored and recorded upon each receiving. The raw material temperature during transportation should be maintained below 50C (except for live aquatic animal such as bivalve molluscs) in order to inhibit microbial growth. If the temperature of raw material upon receipt is high, sensory evaluation on the raw material quality shall be conducted. If the quality is acceptable, the temperature shall be quickly reduced below 50C by adding ice and then further processing the raw materials immediately.
- Each lot of raw material received shall be subjected to physical examination and recorded. Defective and early-stage decomposed raw materials shall be culled off prior to further process.

Good Hygiene Practices (GHP) in the processing of fishery products includes guidelines for controlling the operations of processing raw materials to prevent contamination and ensure the safety and quality of seafood products.

Some key considerations for GHP in the control of raw materials include:

- *Sourcing: Raw seafood materials should be sourced from reputable suppliers who follow good hygiene practices and who meet food safety requirements.*
- *Receiving and inspection: Raw seafood materials should be received and inspected to ensure that they are of good quality and free from visible signs of spoilage or contamination.*
- *Storage: Raw seafood materials should be stored at appropriate temperatures to prevent spoilage and minimize the growth of bacteria and other pathogens. Raw materials should also be stored in a manner that minimizes the risk of cross-contamination.*
- *Record keeping: Records should be kept of the receipt, storage, and handling of raw seafood materials to ensure traceability and to facilitate the identification of any potential issues or problems.*

By following these guidelines for the control of raw materials in the processing of fishery products, processors can help to ensure that seafood products are safe, wholesome, and of high quality for consumption.

2.2 Food additives

Good hygiene practices in the processing of fishery products are essential to ensure the safety and quality of the final product. This includes the use of food additives. Here are some guidelines for their use:

- Use only approved food additives that are safe and suitable for the intended use. Food additives shall be registered or permitted for use by the competent authority. For exported product, processors should take into account requirements of the importing countries
- For storage and use, the food additive shall be clearly labelled on both original container and small re-packed containers to avoid mistaken use.
- Store food additives in a clean, dry place and keep them away from contaminants.
- Use appropriate measures to prevent cross-contamination, such as using dedicated equipment and utensils.
- Follow the manufacturer's instructions for the use of food additives and use the correct amount.
- Monitor the product regularly to ensure that the food additives are not having an adverse effect on the product quality or safety.
- Keep detailed records of the food additives used and their effects on the product.

In conclusion, the use of food additives in the processing of fishery products must be done with care and in accordance with good hygiene practices to ensure the safety and quality of the final product.

2.3 Water supply

- Water in contact with raw materials and product shall be complied with the potable water quality standard mentioned in the Tofsil-10 (Fish Inspection and Quality Rules-1997, Ammendment-2008, 2014, 2017).
- Water supply shall be adequate for processing and cleaning equipment, tools and processing areas. Water treatment shall be hygienic. Water tanks shall be made of easy-to clean materials, well covered and able to prevent microbial contamination in the water system due to changes of water pressure in the pipes causing a back flow. Pipe ends or water hose tips should not be immersed in water containers during work. A safety valve should be installed at each tap to prevent back flow.
- Water samples shall be examined at least quarterly for microbiological quality on a regular basis and annually for chemical properties.
- If chlorine is applied in the water system, residual chlorine shall be monitored at least twice daily (morning and afternoon). If disinfectants other than chlorine are used, their residues should be monitored as well. If the water quality does not meet the potable water standards, an investigation and corrective actions to improve water supply system shall be conducted.

A good hygiene practice in the processing of fishery products also involves the management of water supply. Here are some guidelines to follow:

- *Use only potable water for processing and rinsing of fishery products.*
- *Regularly monitor the quality of water used in processing to ensure it meets relevant safety standards.*
- *Ensure that water storage tanks and pipes are clean and free from contaminants.*
- *Use appropriate water treatment methods, such as filtration or chlorination, to maintain water quality.*
- *Keep records of water quality monitoring results and treatment methods used.*
- *Regularly clean and sanitize water supply systems, storage tanks, and pipes to prevent contamination.*

In conclusion, the water supply used in the processing of fishery products must be carefully managed to ensure its quality and safety. Adherence to good hygiene practices in this area is critical to producing safe and high-quality fishery products.

2.4 Ice

- Ice used for processing shall meet the potable water standard. If the ice is purchased from an ice making plant, the ice shall be complied with the potable water quality standard mentioned in the Tofsil-10 (Fish Inspection and Quality Rules-1997)
- Storage room including containers and tools used in contact with ice shall be in good condition, clean and hygienic as follows:
 - Transfer of ice from ice making plant to the pre-processing establishment and from storage room to an ice crusher shall not cause contamination.
 - If ice blocks are used, they shall not be placed directly on the floor.
 - If crushed ice is used, it shall be transferred from ice making plant in covered containers to prevent contamination.
- Ice is subject to microbiological quality analysis on a regular basis, at least quarterly.

A good hygiene practice in the processing of fishery products also includes the use of ice. Here are some guidelines to follow:

- *Use only potable water to make ice that will come into contact with the fishery product.*
- *Store ice in clean and well-maintained ice storage containers.*
- *Keep ice storage containers covered and protected from contaminants.*
- *Regularly monitor the quality of ice to ensure it meets relevant safety standards.*
- *Use appropriate methods, such as chlorination or ozonation, to treat the water used to make ice to maintain its quality.*
- *Keep records of the water treatment methods used for ice production and the results of ice quality monitoring.*

The use of ice in the processing of fishery products must be done with care to ensure its safety and quality. Adherence to good hygiene practices in this area is critical to producing safe and high-quality fishery products.

2.5 Control of initial operation

- Raw material temperature shall be maintained below 50C. During processing cold water temperature shall be at 100c or below. If it is not possible to control as such, production time shall be controlled instead.
- If raw material is subject to heat, time and temperature shall be appropriate for the purpose and in compliance with relevant laws and regulations.

- Temperature and time shall be recorded in accordance with the established frequency.
- Upon completion of cooking process, product shall be immediately cooled down to avoid accumulation of heat which will adversely affect product quality and to prevent thermophilic bacterial growth.

3. Maintenance and sanitation

3.1 Maintenance

- Establishment, equipment and tools shall be maintained in good condition and operational according to their purposes, facilitating good hygienic practices and effectively preventing product contamination.

3.2 Cleaning and disinfection

- Cleaning program including method and frequency for equipment, tools and establishment should be in place for both before and after work. Disinfection shall be applied after cleaning of the processing area, equipment and tools in direct contact with food. Such equipment and tools shall not cause product contamination. Thus washing, cleaning and disinfections should be conducted at appropriate frequency such as during lunch break or after work.
- Cleaning tools such as brushes, water wipers shall be non-absorbent, in good condition, not cause contaminations to other tools. They shall be adequate, and stored in an allocated and hygienic storage. As these tools are used for such purposes as cleaning processing equipment including floors and walls, therefore, they should be clean and not cause microbial contamination to the surfaces being cleaned.
- Detergent and disinfectant properties shall be appropriate for use in food processing plant and appropriate for the purposes. For example, household detergents should not be used to remove fat remaining in containers. Appropriate kind and quantity of detergent should be applied according to the instruction on the label.
- Detergents, disinfectants and toxic chemicals shall be stored separately from food ingredients and clearly labelled.

Effective cleaning shall be monitored on a regular basis and recorded.

Cleaning- *The removal of soil, food residues, dirt, grease or other objectionable matter.*

Disinfection- *Reduction by means of biological or chemical agents and/or physical methods in the number of viable microorganisms on surfaces, in water or air to a level that does not compromise food safety and/or suitability.*

3.3 Pest control

Rodents, insects, and disease carrier animals shall not be present in the processing area. They are carriers of dangerous diseases which are contagious to humans through the product. Identifications of filth such as hair, insect parts indicated poor sanitary control.

Pests can introduce contaminants into the processing environment and cause significant damage to equipment and products. Here are some guidelines for pest control in fishery products:

- *Regularly inspect the processing facilities for evidence of pests.*
- *Implement a comprehensive pest control program that includes the use of physical, chemical, and biological control methods.*
- *Use appropriate pest control methods, such as trapping, baiting, and fumigation, to manage pests effectively.*
- *Store food and raw materials in pest-proof containers to prevent contamination.*
- *Keep processing facilities clean and well-maintained to minimize the attraction of pests.*
- *Regularly monitor the effectiveness of the pest control program and make changes as necessary.*

- Building shall be maintained in good conditions. There is no access for insects and disease carrier animals such as bottom clearance of the door connecting to the processing area, ventilation outlets or drainage system opening to outside of the building. All openings should be appropriately covered to prevent rodents and insects.
- Regular control and eradication program for rodents, insects, and disease carrier animals shall be in place. If chemicals are used, they shall be approved by a recognized agency. Dosages used shall be properly controlled. Operators shall have knowledge on the application and shall prevent contamination to product or food contact surfaces.
- Evidence or track of disease carrier animal and openings in the processing area shall be monitored on a daily basis.

3.4 Waste and waste water management

- Waste such as heads, offal, skins, bones, shells should be regularly removed from the processing area in an appropriate frequency. The transfer should be conducted in a hygienic manner and not cause contamination to product. These waste materials and rubbish are source of microorganism accumulation. If these waste materials are not handled hygienically, they are likely to contaminate the product.
- Waste containers shall be made of easy-to-clean materials, strictly used only for waste materials and kept clean. The designated container is aimed at avoiding cross contamination with the product as microorganisms are significantly accumulated in waste materials. If waste containers are used for containing products, contamination will occur.

Waste and waste water management: Some guidelines to follow-

- *Store and handle waste in a manner that minimizes the risk of contamination.*
- *Segregate different types of waste to minimize cross-contamination.*
- *Dispose of waste in an environmentally safe manner, such as through appropriate recycling or composting methods.*
- *Treat waste water before discharge to minimize environmental impact and to comply with relevant regulations.*
- *Regularly monitor the quality of waste water to ensure it meets relevant safety standards.*
- *Keep detailed records of waste and waste water management activities, including the methods used for treatment and disposal.*

- The area for waste and trash shall be separated, closed and hygienic. If the waste area is located outside the building, covers shall be used to prevent odour and rodents, insects, and other animal harbourage and infestations.
- Waste water shall be appropriately discharged without contamination to the product.

3.5 Toilets

- Adequate number of toilets shall be provided and located separately from processing area. Toilet doors shall not open directly to the processing area.
- Toilet areas shall be in good condition, clean and hygienic as toilets may be a spreading source of the microorganisms causing gastroenteritis to human. If there is unhygienic practice, these microorganisms may contaminate the product and be harmful to consumer health. Toilets should be equipped with non-hand operated taps, liquid soaps, hand drying materials such as paper towels and rubbish bins with cover.
- Waste shall be hygienically disposed of and clearly separated from waste water treatment.

Toilets can be a source of contamination if not managed properly. Some guidelines to follow:

- Provide separate toilets for employees and for visitors to the processing facilities.
- Ensure that toilets are kept clean and well-maintained at all times.
- Provide adequate hand-washing facilities near the toilets.
- Regularly monitor the cleanliness and functionality of toilets and hand-washing facilities.
- Implement a regular cleaning and disinfection schedule for toilets and hand-washing facilities.
- Keep detailed records of the cleaning and disinfection activities for toilets and hand-washing facilities.

3.6 Hand wash basin and foot bath

- Hand wash basin shall be maintained in a good condition, clean and equipped with non-hand operated taps, liquid soaps, hand drying materials such as paper towels or disposable hand towels. The hand operated taps shall be avoided because microorganisms can spread from one person to another using the same taps. Replacing bar by liquid soap will help preventing microbial accumulations on the bar. Repeatedly use of hand towels will not only cause microbial accumulations but also cause microbial transmission to those who have cleaned hands.
- The number of hand wash basin shall be adequate and located at every entrance and inside the processing area at the practical points.
- Basins containing disinfectants for hand and glove dips shall be available at each entrance to processing area. The disinfectant concentration should be appropriate and monitored. For examples, if chlorinated water is use for disinfection, residual chlorine shall be regularly examined in order to maintain the effectiveness.
- Foot bath shall be installed at each entrance to processing area containing adequate and appropriate concentration of disinfectants. If chlorine is used, the chlorinated water should be 100-200ppm . The chlorinated water level in the foot bath should be at least maintained to cover the back of the feet and the chlorine concentration should be checked to keep the standard. (Note: USFDA approved 200-400ppm for foot bath).

Guidelines to follow:

- *Provide adequate hand-washing and foot-bathing facilities in processing areas.*
- *Ensure that hand-washing and foot-bathing facilities are easily accessible and conveniently located.*
- *Provide soap, water, and towels or other means of hand-drying.*
- *Ensure that hand-washing and foot-bathing facilities are kept clean and well-maintained at all times.*
- *Regularly monitor the cleanliness and functionality of hand-washing and foot-bathing facilities.*
- *Implement a regular cleaning and disinfection schedule for hand-washing and foot-bathing facilities.*
- *Keep detailed records of the cleaning and disinfection activities for hand-washing and foot-bathing facilities*

4. Personal hygiene

4.1 Personnel

- Food handlers in the processing area shall not suffer from serious contagious diseases such as tuberculosis, a carrier of gastrointestinal diseases such as cholera, typhoid, and diarrhoea. They shall undergo medical examination including serious contagious and gastrointestinal diseases before being admitted to work and at least annually in the following years. The medical examination record shall be maintained.

Personnel:

- *Provide training and education on good personal hygiene practices for all employees.*
- *Require employees to wash their hands thoroughly with soap and water before handling food or entering processing areas.*
- *Prohibit employees from eating, drinking, chewing gum, or smoking in processing areas.*
- *Provide appropriate protective clothing and equipment, such as hairnets, gloves, and aprons, to employees working in processing areas.*
- *Require employees to report any illnesses or skin infections to their supervisor.*
- *Implement policies to prevent employees from working while ill.*
- *Regularly monitor the personal hygiene practices of employees and take corrective action as necessary.*

- Food handlers working in the processing area shall not have open or infected wound or lesions that could contaminate the product except there is appropriate protection such as covering the wound with plaster before putting on gloves. Sick Food handlers with the symptoms such as fever, sore throat, dysentery, vomiting, infected skin, shall immediately report to supervisor for transfer to another section not involving food or taking a sick leave until full recovery.

4.2 Personal practices

- Food handlers shall work in a hygienic manner. Operators working in processing area or in contact with raw materials shall always maintain good personal hygiene. They shall wash their hands and dip in disinfectant solutions both before and during work as appropriate, for example, after contacting dirty materials or upon each return to processing area and after using the toilet. Hand washing upon entering the processing area is necessary since the operators may cause contamination after leaving the processing area.

- *Require employees to maintain good personal hygiene, including regular hand-washing and showering, to minimize the risk of contamination.*
- *Prohibit employees from wearing jewelry, such as rings, bracelets, and watches, while working in processing areas.*
- *Require employees to cover cuts and open sores with a waterproof bandage and to report any injuries to their supervisor.*
- *Implement policies to prevent employees from bringing food or drinks into processing areas.*
- *Prohibit employees from using tobacco products in processing areas.*
- *Regularly monitor the personal practices of employees and take corrective action as necessary.*

- Clothes and workwear shall be clean and hygienic. Workwear should not be worn from home as microorganisms or dirt from outside may contaminate. Clothes changing or wearing workwear arranged by the pre-processing establishment at the production site will help minimize and control the contamination of dust from clothes. During processing, hair shall be covered and jewellery shall not be worn. Aprons used shall be waterproof with proper length that is not too long and contact the floor. Boots and gloves shall be clean.

5. Product storage

Good hygiene practices in the processing of fishery products also involve proper storage of products to minimize the risk of contamination.

5.1 Storage practices

- Store raw materials and finished products in separate, designated areas.
- Store raw materials and finished products in a manner that prevents contamination, such as in clean, covered containers or in refrigerated units.

- Store raw materials and finished products at appropriate temperatures to prevent spoilage and the growth of harmful microorganisms.
- Store raw materials and finished products in a manner that prevents cross-contamination, such as by using separate cutting boards and utensils for raw and cooked products.
- Store raw materials and finished products in a manner that prevents physical damage, such as by using appropriate packaging materials.
- Store raw materials and finished products in a manner that allows for proper rotation, using the first-in, first-out (FIFO) method.
- Regularly inspect stored products for signs of spoilage or contamination and take corrective action as necessary.

- *Storage area shall be located separately from the processing area. Storage shall not cause contamination to the product. The area shall be clean with good ventilation.*
- *Temperature of product, if not at frozen stage, shall be maintained below 50C at all times.*
- *Products shall be stored orderly and the area shall be regularly cleaned.*

5.2 Product identification

- Origins of the fishery products during storage shall be identified for traceability purposes.

6. Document and record keeping

- Record on sanitary control shall be available and containing the followings:
 - Name and address of the pre-processing establishment
 - Structure, materials, equipment and tools
 - Maintenance and cleaning program
 - Personnel
 - Water and ice
 - Rodent, Insect and disease carrier animal control program
 - Quality control for raw material and processing
 - Other controls including chemical control and waste management
- Sanitary control shall be recorded as specified and maintained at least 2 year for further inspection.

7. Training

- Operators in contact with food and quality controllers shall have knowledge or experiences or be trained to understand food safety standard, good hygienic practices for pre-processing establishment and quality control.
- Training will help operators fully understand the nature of work and food safety at every point of the operation and be able to perform appropriate task.

Session Plan

Day: 02	Session: 2.3	Duration: 60 Minutes
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Session Title: Introduction to Sanitation Control Procedures.

Learning objectives

At the end of this session, participants will be able to-

- Have a basic understanding of the concepts and principles of sanitation in the food processing industry.
- Identify and understand the key procedures for controlling sanitation in food processing operations.
- Implement sanitation procedures, such as cleaning and sanitizing equipment and maintaining good personal hygiene, in their daily operations.
- Recognize potential sanitation hazards in the processing environment and take appropriate measures to control them;
- Understand CCP vs. Sanitation Control Procedures;
- Understand and comply with relevant food safety and sanitation control regulations.

By achieving these objectives, participants will be able to improve their sanitation practices in processing operations, leading to a safer and higher-quality food product.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system with written objectives and training

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Sanitation Control Procedures and CCP vs SCP	Check participants' understanding about Sanitation Control Procedures CCP & SCP through question and answer. Now present and discuss the topic using PPT slides and the attached hand-out.	15 Minutes
Step-3	Specific sanitation control regulations & sanitation monitoring	Check their understanding about specific sanitation control regulations, Sanitation monitoring. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	Safety of water	Check participants understanding why safety of water is required, safe water sources and water contamination. Now give the participants a short overview safety of water, water quality standard using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check your understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Introduction to Sanitation Control Procedures

Each processor should have and implement written Sanitation Standard Operating Procedures (SSOP), and monitor the sanitary conditions and practices during processing. SSOP is an integral part of the seafood HACCP as Pre-requisite program and processors need to pay more attention to routine sanitary practices. SSOP is necessary because:

- sanitation practices directly affect the microbiological safety of seafood products that are not further cooked by the consumer, such as, ready-to-eat products, smoked products, raw molluscan shellfish, and other fish that are consumed raw;
- sanitation practices are relevant to the microbiological safety of seafood products even where these products are to be cooked by the consumer;
- sanitation practices directly affect the chemical and physical safety of seafood products;
- nearly half of the consumer complaints relating to seafood are related to the processing plant or food hygiene; and
- inspections demonstrate that a significant portion of seafood processors operate under poor sanitation conditions.
- Significant hazards may be reduced.

Prerequisite programme: Programmes including Good Hygiene Practices, Good Aquacultural Practices and Good Manufacturing Practices, as well as other practices and procedures such as training and traceability, that establish the basic environmental and operating conditions that set the foundation for implementation of a HACCP system.

SSOP: it is an outline how a food processing plant or establishment will maintain sanitary control within the plant.

1. CCP vs. Sanitation Control Procedures

A complete food safety program includes both a HACCP plan and the accompanying sanitation control procedures based on GMP. Both components require monitoring, corrections and recordkeeping, yet there are a few regulatory subtleties that should be distinguished for each component.

CCP- A step at which a control measure or control measures, essential to control a significant hazard, is/are applied in a HACCP system.

The HACCP plan for seafood safety is built on a hazard analysis that reveals specific critical control points (CCP) that must be monitored to ensure that a processing step or procedure is in control so as to prevent, eliminate, or reduce to an acceptable level, any potential food-safety hazard. The written HACCP plan specifies the various CCP for a particular process and details the critical limits, monitoring methods, corrective actions, verification procedures and records to be used to assure that control is maintained at a CCP.

Some hazards are best controlled through sanitation control procedures. Relegating control of a hazard to sanitation control procedures rather than HACCP does not minimize its importance. It simply may be the most appropriate means of control. Frequently, both HACCP and sanitation control procedures are necessary to control a hazard. For example, under HACCP a critical control point is implemented at a smokehouse to make sure sufficient heat is applied to kill potential pathogenic bacteria. Sanitation monitoring to ensure proper employee hygiene and plant sanitation is necessary to minimize the potential for recontamination the product after smoking.

Identified hazards which are inherent to the product or are associated with a discrete processing step must be controlled with HACCP. Hazards associated with the processing environment or personnel are usually better controlled with sanitation control procedures. Sanitation monitoring can be used to control hazards associated with the eight sanitation areas listed in the HACCP regulation and covered in this course.

Critical Control Points (CCP) are specific points in the food production process where a failure in control could lead to an unacceptable health risk for consumers. For example, in meat processing, cooking temperature would be a CCP to ensure that pathogens are destroyed. CCPs are used in Hazard Analysis and Critical Control Point (HACCP) system, which is a systematic approach to food safety.

Sanitation Control Procedures refer to the measures taken to maintain cleanliness and hygiene in a food processing plant. This includes procedures for cleaning and sanitizing equipment, surfaces, and facilities to prevent contamination of food products. Sanitation is an important aspect of food safety and helps to prevent foodborne illness by controlling physical, chemical, and biological hazards.

While CCPs focus on controlling specific critical points in the production process to ensure food safety, Sanitation Control Procedures focus on maintaining cleanliness and hygiene in the food processing environment. Both are important for ensuring the safety of food products for consumers.

The distinction between CCP and sanitation control procedures is not always clear. For this reason, the sanitary controls for safety to be included in the HACCP plan. In most situations, processors should not complicate the HACCP plan with sanitation monitoring requirements that would be better served in sanitation control procedures. It would be difficult to assign and meet critical limits and corrective actions for certain sanitation controls and excessive sanitation monitoring assigned at CCP could burden the HACCP plan and detract attention from critical processing procedures. Sanitary conditions usually relate to the entire processing facility or an area, not just to a limited or specific processing step or CCP. In some instances, a seafood processing operation may not require a specific HACCP plan because the hazard analysis revealed no significant hazards, yet all processing firms must always monitor for sanitary conditions and practices.

2. Specific sanitation control regulations

A written SSOP plan explaining the sanitation concerns, controls, in-plant procedures and monitoring requirements is recommended, but not required by any regulation. This course encourages development and use of written SSOP plans and offers sanitation guidelines.

In developing the seafood HACCP regulation, regulatory authorities used findings from previous regulatory inspections and consumer complaints to determine the most common sanitary problems. The results, based on inspections indicated that some processing firms had problems with general sanitation conditions in the processing area. For example, processing firms:

- did not clean and sanitize their processing areas or equipment throughout the day's production;
- had employees that were not following proper sanitation practices in processing, packaging, or finished product storage activities;
- lacked hand sanitizers in their processing area or had sanitizers that were not kept at proper sanitizing levels.

This training program is built around these eight key areas of sanitation to be discussed in training as the

Eight Key Sanitation Conditions.

- (1) Safety of water and ice;
- (2) Condition and cleanliness of food contact surfaces, including utensils, gloves and outer garments;
- (3) Prevention of cross-contamination (FDA Key Sanitation Condition);
- (4) Hand Washing/Sanitizing, and Toilet facilities;
- (5) Protection of Food, Food –Packaging Materials and Food – Contact Surfaces from Adulterants;
- (6) Labelling, Storage, and use of Toxic Compound;
- (7) Employee health condition;
- (8) Pest Control.

Monitoring will provide the required sanitation control records that, at a minimum, document the processor's efforts in monitoring and correcting sanitary practices and conditions. The required monitoring information must be recorded at the time it is observed.

When sanitation problems are detected as a result of sanitation monitoring, corrections must be taken in a timely manner to ensure compliance with the GMP. Sanitation monitoring and corrections must be documented. These records can be reviewed by inspectors, but are not required to be reviewed by plant personnel. This is in contrast with HACCP records which must be reviewed by plant personnel. Likewise, CCP are subject to mandatory verifications, whereas sanitation controls are not. Although not required by the HACCP rule, reviews and verifications are strongly encouraged in order to support the sanitation control procedures.

All sanitation monitoring and corrections, and HACCP records 'shall' be available for official review and copying at reasonable times. Likewise, the sanitation control records shall be retained at the processing facility for at least one year after the date they were prepared in the case of refrigerated products and for at least two years after the date they were prepared in the case of frozen, preserved, or shelf-stable products.

3. Sanitation monitoring

There is no mandatory or specified method or form for routine use in sanitation monitoring. HACCP does, however, require processors to consider all of the eight key sanitation conditions. A daily clipboard check sheet is one common approach offered by this course. Other approaches can involve automated recording, electronic records, or other innovative approaches. Monitoring should be customized for the particular processing facility and operation. The success of the monitoring method does not depend on the approach, but on the evidence, it yields to reflect routine and appropriate sanitation practices.

The parts that are common to most sanitation monitoring forms are: 1) a specific sanitation condition or practice that is to be monitored; 2) space to record observations or measurements of the condition being monitored at the prescribed frequency for monitoring; and 3) space to document any necessary corrections.

In most cases, the records can be marks for "Satisfactory" or "Unsatisfactory" (S/U), "Pass" or "Fail" (P/F), "Yes" or "No" (Y/N), or and to denote the sanitary condition or practice. However, more detail is necessary to record 'actual values' or measurements when necessary (e.g., sanitizer concentrations, time of observations, etc.).

4. Safety of water

This session relates to the source and transport of water that comes into contact with food or food contact surfaces or is used in the manufacture of ice. Cross-connections between potable and non-potable water systems are also discussed.

A primary safety concern for any food processing operation should be the safety of water. A complete SSOP plan must first account for the sources and treatment of water that comes in contact with food or food contact surfaces or is used to make ice. It must also consider cross-connections between the safe water supply (potable water) and any unsafe or questionable water supply (non-potable) or sewer disposal systems. In seafood processing plants, cross-connections have been found in many places, such as, hard plumbing between potable and non-potable water lines; unprotected hose bibs (i.e., those with no backflow prevention devices); hoses lying in pooled water or submerged in wash tanks; or metering pumps used for cleaning chemicals without a backflow prevention device.

Safe water: means water that, in particular, is free from hazardous substances (micro-organisms, chemical substances and radiological hazards) that meets the requirements of drinking water standards set by the authority.

Water is of major importance because of its broad use and application in food processing. It is used: 1) as an ingredient in some seafood products; 2) to convey or transport products; 3) to wash foods; 4) to clean and sanitize facilities, utensils, containers, and equipment; 5) to make ice and glazed products; and 6) for drinking. All of these require safe water that will not cause contamination of the food.

4.1 Monitoring - Sources

Whether water is obtained from a public or municipal source, private well, or as seawater, the supply must be monitored with sufficient frequency to assure that the water is safe for use on foods and food contact surfaces.

Municipal Water - water quality analysis could provide not only water safety information, may also reveal information (e.g., water hardness and mineral content) that could influence processing conditions other than food safety.

Private (Well) Water - likewise, private water sources should be monitored to determine if the water meets approved standards. This requires laboratory analysis, which at a minimum should include testing for indicator bacteria such as total coliforms.

Seawater - the company or vessel using seawater to process fish and fishery products should consider monitoring the original source, the water after any necessary treatments, and water from storage tanks.

4.2 Monitoring - Plumbing

Monthly monitoring is also usually adequate for problematic cross-connections in hard (permanent) plumbing between the potable water lines and non-potable water or sewer lines. More frequent (e.g., daily) monitoring is required to prevent potential water contamination from cross-connections created by back siphonage or improper use of hoses (e.g., direct submergence in tanks; lying on the floor).

4.3 Monitoring - Ice

In addition to monitoring for the safety of the water source and associated plumbing, periodic monitoring should be conducted for the safety of the ice made from the water supply. Ice and its storage and handling conditions can be responsible for spreading problematic bacteria. This situation usually results from contamination of the ice as a result of insanitary storage, conveying, shoveling, or contact with floors.

4.4 Corrections

When monitoring detects a problem with the processing water source, the processor must evaluate the situation and, if necessary, discontinue use of water from that source until the problem is solved and retesting confirms that it no longer exists. Additionally, the need to take action regarding any and all products produced under the adverse conditions must be assessed.

4.5 Records

Sanitation control records are necessary to document that the processor is consistently conforming to sanitary conditions and practices. The actual records will vary to accommodate differences in processing operations. If a private water source or seawater were used in the operations, the results of the water testing would also be recorded on this form. Test results should be recorded and stored. If any contamination is indicated, corrections and retesting results should be recorded and stored with the appropriate Sanitation Control Record.

The record also includes a check mark indicating that the processor had performed a monthly check for the presence of cross-connections in the hard plumbing.

4.6 Water standards

Water quality standard mentioned in the Schedule-10 of "The Fish and Fish Products (Inspection & Quality Control) Rules, 1997 (Amended 2008, 2014, 2017)" contain limits or maximum contaminants levels (MCL) for numerous organic and inorganic chemicals and microbial parameters.

4.7 Water Sources

Municipalities are the most common source of water for processing fish and fishery products. It is often the more expensive source, but cost must be weighed against safety, quality and availability.

Private water can come from a variety of surface sources, but it is most often obtained from wells. Wells are drilled by food plants to provide less costly, more reliable, or higher quality water than might be available locally. Properly maintained, wells can provide clean water that assures high quality and food safety, but they are often more subject to contamination than most municipal sources.

Well water may or may not be less contaminated than water from other sources. The decision on whether or not to add disinfecting chemicals must be based on microbiological tests which can be performed by either local health agencies or private laboratories.

The use of seawater in processing is usually limited to some remote coastal locations and certain processing vessels. In some situations, it has been drawn from local, active harbors. As a natural source subject to daily and seasonal conditions, and environmental contamination, the safety and quality of the water may be questionable.

4.8 In-plant water contamination

Caution must be exercised to avoid contamination of the potable water system with fluids from other sources. This type of contamination may occur as a result of cross-connections, backflow, or back siphonage. These problems can result from improper installations, altered plumbing and additions to the existing plumbing. Also, submerged inlets can result from the improper placement of unrestricted pipe intakes or open hoses. In some cases, the problems may result because the plumber doing the installation or modification was unaware of the potential water quality problems.

Contaminant: *Any biological, chemical or physical agent, foreign matter or other substances not intentionally added to food that may compromise food safety or suitability.*

Contamination: *The introduction or occurrence of a contaminant in the food or food environment.*

Session Plan

Day: 02	Session: 2.4	Duration: 60 Minutes
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Session Title: Condition and Cleanliness of Food Contact Surfaces.

Learning objectives

At the end of the session, participants should have a better understanding of the following:

- Food safety: The importance of food safety and the role of clean food contact surfaces in maintaining it.
- Cleaning and sanitation procedures: The key procedures for cleaning and sanitizing utensils/- food contact surfaces.
- Implementation of cleaning procedures: Participants should be able to put into practice the proper cleaning procedures for food contact surfaces, including the use of appropriate cleaning products, methods, and equipment.
- Inspection and maintenance of food contact surfaces: Participants should be able to inspect and maintain food contact surfaces effectively to ensure they are in good condition and free from contaminants.
- Compliance with regulations: Participants should be able to understand and comply with relevant food safety regulations regarding the condition and cleanliness of food contact surfaces.

By mastering these objectives, participants can improve their practices in maintaining clean food contact surfaces, leading to safer and higher quality food products.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system with written objectives and training

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed. Warm-up Activity	4 Minutes
Step-2	Monitoring, corrections & records	Check participants' understanding about monitoring of conditions of cleanliness of food contact surfaces. Now present and discuss the topic using PPT slides and the attached hand-out.	15 Minutes
Step-3	Materials for food contact surfaces	Check their understanding about materials used for food contact surfaces. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	Equipment design and cleaning and sanitizing food contact surfaces	Check participants understanding why safety of water is required, safe water sources and water contamination. Now give the participants a short overview safety of water, water quality standard using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Warm-up Activity

Title: "Spot the Clean Surface"

Objective: To reinforce the importance of maintaining clean and hygienic food contact surfaces.

Materials: Pictures of different surfaces that come in contact with food (e.g., cutting boards, countertops, utensils, etc.), timer.

Instructions:

1. Divide the participants into teams of 4-5 members each.
2. Show the teams a picture of a food contact surface for 10 seconds.
3. After the picture is taken away, the teams have to discuss and decide if the surface in the picture is clean or dirty.
4. Teams have to hold up either a green card (indicating that the surface is clean) or a red card (indicating that the surface is dirty) based on their decision.
5. The facilitator then reveals the correct answer and explains the reasons behind it.
6. The team that has the highest number of correct answers wins the game.

Variation: For a more challenging version of the game, you can mix up the pictures and add in some that are difficult to determine whether they are clean or dirty. You can also add a time limit to increase the difficulty.

Key Takeaways: The activity helps to reinforce the importance of maintaining clean and hygienic food contact surfaces. It encourages participants to pay attention to details and to be mindful of the food safety practices they adopt while handling food.

Condition and Cleanliness of Food Contact Surfaces

Food contact surfaces in food processing can include all equipment, utensils and facilities used during processing; as well as, worker clothing and hands, and packaging materials. This is a very comprehensive concern because potential food contamination can come from numerous direct or indirect routes that are not always obvious during the processing operation.

Those surfaces that contact human food and those surfaces from which drainage onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. Typical food contact surfaces include utensils, knives, tables, cutting boards, conveyor belts, ice makers, ice storage bins, gloves, aprons, etc."

1. Monitoring

A complete SSOP plan will account for all food contact surfaces that could lead to direct or indirect contamination of foods during processing. A monitoring program should ensure that-

- processing equipment and utensils (food contact surfaces) are in suitable condition for sanitary processing,
- equipment and utensils are properly cleaned and sanitized,
- the type and concentration of sanitizer(s) is acceptable as applied, and that gloves and outer garments which might contact food are clean and in good condition.

Monitor: The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a control measure is under control.

Monitoring is the act of observing, measuring, or checking a system, process, or activity over a period of time to ensure that it is functioning properly and to identify any deviations or changes. The purpose of monitoring is to ensure that a process is operating within established parameters and to detect any potential issues that may arise.

In the context of food processing, monitoring refers to the process of observing and measuring various aspects of food production and preparation, including critical control points (CCPs), environmental conditions, equipment performance, employee behaviour, and product quality, to ensure that food safety and quality standards are met. Monitoring is a key component of food safety programs, such as Hazard Analysis and Critical Control Point (HACCP), as it helps to detect and prevent food safety issues and to maintain the safety and quality of food products for consumers.

Goal

Monitoring should provide assurance that food contact surfaces including gloves and outer garments are properly designed, constructed and maintained to facilitate sanitation, and that they are adequately and routinely cleaned and sanitized.

What to monitor

- Condition of the food contact surfaces;
- Cleanliness and sanitation of food contact surfaces;
- Type and concentration of sanitizer(s) used; and
- Gloves and outer garments which might contact food are clean and in good condition.

How to monitor

- Visual Inspection -
 - Surfaces in good condition;
 - Surfaces cleaned and sanitized; and
 - Gloves and outer garments clean and in good repair.
- Chemical Testing -
 - Sanitizer concentration (test strips or kits).
- Verification Checks -
 - Microbial tests of surfaces (optional).

Monitoring frequency

Monitoring frequency depends on what is monitored. Inspection of equipment for proper design (ensuring adequate drainage, for example) and evidence of corrosion may be sufficiently performed on a monthly schedule. Sanitizer concentrations are usually determined at the time they are applied as part of plant clean-up procedures. Where sanitizers are prepared over the course of the day, they should be checked periodically during the day.

2. Corrections

Problems discovered during monitoring must be corrected in a timely manner. If a piece of equipment is corroded, the correction may involve refinishing or replacement of the equipment. If a work surface is not cleaned it should be properly cleaned and sanitized before beginning work. If a sanitizer concentration is too weak, it should be replaced or adjusted to the proper strength. If monitoring indicates a concentration outside of this range, the concentration must be corrected and documented. Typical corrections are –

- Observation: Sanitizer concentration from dispenser varies day to day.
Correction: Repair or replace chemical proportioning equipment and train cleaning crew in its proper use.
- Observation: Juncture of two table tops traps food debris.
Correction: Separate tables to allow access for cleaning.
- Observation: Table work surfaces show signs of corrosion.
Correction: Refinish or replace damaged equipment and switch to less corrosive cleaning compound.

3. Records

Sanitation control records provide evidence that the company's sanitation program is adequate, that it is followed and problems are identified and corrected. The actual records or recording forms will differ to suit a particular processing operation. Notice some of the approaches used in the various types of records.

- The Monthly Sanitation Control Record allows for a more comprehensive check of the conditions and workmanship of all food contact surfaces and equipment in the plant, while the corresponding Daily Sanitation Control Record can allow for more detailed checks for the cleanliness of the food contact surfaces.
- Observations are recorded more frequently for those food contact surfaces associated with ready-to-eat products than those associated with the raw, to-be-cooked seafood processing line.
- A pre-operational monitoring (Pre-Op) check is recommended for all processing operations. It discovers any problems and makes necessary corrections before any processing begins.
- Pre-Op and "Start" conditions can differ. For example, a Pre-Op check monitors cleanliness of the equipment, while another check at "Start" is necessary to assure that the workers have clean gloves and aprons, something that cannot be checked during pre-op.
- Actual values are recorded where a value is available such as sanitizer concentrations, etc. The type and strength of the sanitizer being used is listed as a useful reminder of the target value.
- Ample space is available to mark corrections. An "Unsatisfactory" (U), observation is always followed by a recorded correction.
- The times for all observations, including corrections, are recorded.

Records: Written documents of any information which has historical evidence
Records should contain the following information

- *Form title*
- *Establishment name and location*
- *Time and date*
- *Product identification*
- *Actual observation or measurement*
- *Critical limit*
- *Operator's signature or initial*
- *Reviewer's signature or initial*
- *Date of review*

4. Materials for food contact surfaces

Proper selection of materials and design of food contact surfaces can help prevent potential food contamination. Features for durability and function are important, but they cannot compromise concerns for food safety. In simple terms, surfaces should be safe, non-corrosive and easily cleaned and sanitized. General requirements for food contact surfaces –

- Safe Material -
 - Non-toxic (no leaching of chemicals);
 - Non-absorbent (can be drained and/or dried);
 - Resist corrosion; and
 - Inert to cleaning and sanitizing chemicals.
- Fabrication -
 - Can be adequately cleaned and sanitized; and
 - Smooth surfaces including seams, corners, and edges

General characteristics of some food contact surfaces -

Surface Materials	Concerns	Recommendations
Black iron or cast iron	Acids or chlorinated detergents. Can cause rust. Lacks strength.	Not recommended in food processing.
Concrete	Often etched by acidic seafoods and cleaning compounds. Can crack.	Concrete should be dense and acid resistant. Materials should not loosen from surface. Use alkaline cleaners.
Glass	Strong caustic cleaning compound can etch.	Clean with moderately alkaline or neutral detergents.
Plastics	Some stain easily. Currently available materials cannot be used at very low or high processing temperatures.	Best to color coordinate items for intended use (i.e., raw vs. cooked) and select plastics that will not deform or crack when exposed to processing temperatures.
Rubber	Damaged by certain solvents. Trimming boards can warp and their surface can dull knife blades.	Avoid porous or spongy types that hold water or food debris.

Stainless steel	Expensive, certain grades are pitted by chlorine or other oxidizers.	Best metal surfaces for food processing. Consider 300 level series.
Lead	Solder and flux containing lead in excess of 0.2% may not be used as a food contact surface	Try to eliminate use in food processing plant.
Wood	Pervious to moisture and oils/fats. Softened by alkali and other caustics. Often difficult to clean.	Treated woods must meet criteria for wood preservatives. Limit use as food contact surface.
Galvanized metals	Tend to rust leaving a white powder by-product due to zinc corrosion that could cause product adulteration.	Avoid use as food contact surface. Should not be used with acidic foods.
Paint and sealants	Chemical leaching, flaking and peeling.	Generally, not recommended for direct contact surfaces, especially those subject to abrasion. Use only approved substances.

Food conditions that can influence choice of appropriate food contact surfaces

- Pickled fish (e.g., herrings, mackerel) - Strongly corrosive; High acidity and salts
- Salt cured fish products (e.g., smoked fish, brined shrimp) - Moderately corrosive; Medium acidity and salts
- Fresh and refrigerated fish (e.g., peeled shrimp, fillets, shucked oysters, picked crab meat, surimi) - Weakly corrosive, Low acidity
- Fish powders, Dried fish (e.g., freeze dried shrimp, fish protein concentrate) - non-corrosive
- Frozen Fish (e.g., IQF frozen shrimp) - non-corrosive

Food contact surface materials which normally should be avoided if feasible:

- Wood (microbial concerns);
- Ferrous metals (corrosion concerns);
- Brass (variable corrosion resistance and product quality concerns); and
- Galvanized metal (corrosion and chemical leaching concerns).

Storage of clothing and gloves –

- Store clothing and gloves in clean and dry locations;
- Ensure that clothing and gloves are not exposed to splash, dust or other contaminants; and
- Store clean garments separately from soiled garments and gloves.

5. Equipment design, fabrication and location

The design, fabrication, and location of food contact surfaces are important factors in ensuring cleanliness and safety. Some considerations for these factors are:

- **Equipment Design:** Food contact surfaces should be designed to minimize the accumulation of dirt and food debris. Smooth surfaces that are free of cracks and crevices are easier to clean and sanitize. Any seams or joints should be smoothly bonded. Equipment should be designed to avoid sharp angles or structures that hinder proper cleaning and sanitation.
- **Fabrication:** Food contact surfaces should be constructed from materials that are safe for food contact and are resistant to corrosion, wear, and abrasion. The equipment should also be designed to minimize the risk of contamination from environmental sources such as dust, water, and other contaminants.

- Location: Food contact surfaces should be located in areas that are free from contamination and are easily accessible for cleaning and sanitizing. This may include dedicated areas for food preparation, separate from areas used for storage or other non-food activities.

Design and Install Food Contact Equipment to:

- Drain and not entrap soils;
- Provide access for cleaning and inspection; and
- Withstand plant environment.

It is also important to ensure that food contact surfaces are properly maintained and cleaned. This may include regular cleaning and sanitizing procedures, as well as the use of effective cleaning and sanitizing agents. Any equipment or surfaces that are damaged or showing signs of wear and tear should be repaired or replaced to maintain their cleanliness and safety.

6. Cleaning and sanitizing food contact surfaces

Clean, sanitary food contact surfaces are fundamental to the control of pathogenic microorganisms. The contamination of seafood through either direct or indirect contact with insanitary surfaces potentially compromises the safety of that product for consumption.

Five Steps of Cleaning and Sanitizing -

- Dry-clean;
- Pre-rinse;
- Detergent application, the
- Post-rinse; and
- Sanitizing

Cleaning

The importance of cleaning cannot be overemphasized. The effectiveness of a company's sanitation program more often relates to the implementation of proper cleaning procedures than to the type of sanitizer used. Simply rinsing equipment and processing surfaces with a chlorine solution, at any concentration, will not sanitize surfaces unless they are first cleaned with an appropriate detergent. The selection of detergents and sanitizers, their concentrations, and method of application will depend on several factors including:

- nature of the soil;
- degree of cleaning and sanitation required;
- type of surface to be cleaned; and
- type of equipment used for cleaning and sanitizing.

Types of Detergents:

- General Purpose (GP);
- Alkaline;
- Chlorinated (chlorinated alkaline);
- Acid; and
- Enzyme.

A detergent's effectiveness varies with:

- Contact time;
- Temperature;
- Physical disruption (scrubbing); and
- Water chemistry.

Detergent application methods:

- Soak tanks;
- Foam;
- Automated systems;
 - CIP (clean-in-place); and

- Parts washers.
- Manual (pails).

Example Cleaning Procedure – A processor applies an alkaline foam detergent to equipment every day. The detergent is allowed to stand and then is rinsed without scrubbing. Actual scrubbing with brushes or pads takes place only once each week.

Physically removing soils -

- Brushes proper stiffness;
- Pads proper cutting properties; and
- Pressure sprays moderate pressure.

Pads, brushes and brooms should be dedicated to tasks for which they are designed -

- Optimizes cleaning effectiveness; and
- Minimizes cross-contamination between areas of the plant.

Cleaning aids which retain water, such as sponges, wiping cloths and mops should not be used for routine cleaning in processing plants.

Sanitizing

After food contact surfaces are cleaned, they must be sanitized to eliminate or at least suppress potentially harmful bacteria. Many types of chemical sanitizers are commercially available. They may or may not require rinsing before the start of processing, depending upon the sanitizer and its concentration. All sanitizers must be approved for use in food establishments and be prepared and applied as labeled.

Sanitizer Mixing and Application -

- In-line proportioners/applicators;
- Station proportioners/applicators;
 - Hand and footbath sanitizers;
- Foamers;
- Tank sprayers (low pressure); and
- Dips.

Sanitizer	Food contact surfaces	Non-food contact surfaces	Plant water
Chlorine	100 – 200 ppm	400 ppm	3 – 10 ppm
Iodine	12.5 – 25 ppm	12.5 – 25 ppm	
Quats	200 ppm	400 – 800 ppm	
Chlorine dioxide	100 – 200 ppm	100 – 200 ppm	1 – 3 ppm
Per oxyacetic acid	200 – 315 ppm	200 - 315	

7. Confirming Sanitation

Each facility must show evidence, such as completed forms, indicating that appropriate cleaning and sanitation procedures are followed. Consistent results are achieved through development of effective methods, thorough training of employees, management oversight and testing. Evaluation methods usually include some combination of daily and periodic activities.

Periodically, the effectiveness of cleaning and sanitizing plant surfaces can be evaluated by using contact plates containing bacterial growth media.

Microbiological testing is relatively slow and does not reveal problems in time to correct them prior to processing. Recent alternatives, such as luminometry, are gaining acceptance in the food processing industry. Luminometry (bioluminescence) is based on the enzymatic reaction responsible for a firefly's light.

Session Plan

Day: 02	Session: 2.5	Duration: 60 Minutes
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Session Title: Prevention of cross-contamination.

Learning objectives

At the end of this session, participants will be able to-

- Understand cross-contamination and its impact on food safety;
- Understand the importance of monitoring and records in preventing cross-contamination;
- Know the key corrective actions to be taken in the event of cross-contamination;
- Implement effective monitoring and corrective actions;
- Maintain accurate records of monitoring and corrective actions;
- Know preventive measures for reducing cross-contamination risk;
- Implement proper food handling, separating raw and cooked food, and effective sanitation practices;
- Recognize potential cross-contamination hazards and control them;
- Comply with relevant food safety regulations regarding cross-contamination prevention.

By meeting these objectives, participants will improve their practices in preventing cross-contamination, leading to safer and higher quality food products.

Methodology: Demonstration, discussion and Q & A

Materials: PPT slides, board, markers, sound system and hand notes

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Monitoring, corrections & records of cross-contamination	Check participants' understanding about monitoring, corrections & records of monitoring of cross-contamination. Now present and discuss monitoring, corrections & records of monitoring for cross-contamination using PPT slides and the attached hand-out.	15 Minutes
Step-3	Prevention of cross-contamination	Check participants understanding about how to prevent cross-contamination through question and answer. Now the cross-contamination prevention procedures using PPT slides and attached hand-out.	15 Minutes
Step-4	Employee hygiene and food handling practice	Check participants understanding about employee hygiene and food handling practice through question and answer. Now discuss the practices using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Energizer that could be used for "Prevention of Cross-Contamination" training session:

"Pass the Germ"

Instructions:

1. Ask participants to stand in a circle.
2. Give a ball or a soft object to one of the participants.
3. Explain that the ball represents a germ.
4. Instruct participants to pass the ball around the circle as quickly as possible.
5. Every few seconds, call out a command, such as "reverse direction", "throw with your non-dominant hand", or "spin around before passing the ball".
6. After a few rounds of passing the ball, stop the game and ask the participant who is holding the ball to describe how they would prevent the spread of germs in a specific scenario (e.g. in a hospital, at a restaurant, or in a classroom).
7. Repeat the game, passing the ball around the circle again and stopping periodically to ask different participants to describe how they would prevent cross-contamination in different scenarios.

This energizer is a fun and interactive way to get participants moving and engaged while also reinforcing the importance of preventing cross-contamination in various settings.

Prevention of Cross-Contamination

Cross-contamination is the transfer of biological or chemical contaminants to food products from raw foods, food handlers, or the food handling environment. The type of cross-contamination most frequently implicated in foodborne illness occurs when pathogenic bacteria or viruses are transferred to ready-to-eat foods.

Cross-contamination is the unintentional transfer of microorganisms, chemical contaminants (including allergens) or any foreign substance from food, person, or object to another food product. It usually occurs from raw foods to ready-to-eat products (RTE) or between products that contain allergens and allergen-free products.

1. Monitoring

To prevent cross-contamination from insanitary objects to food, food-packing materials and other food-contact surfaces, including utensils, gloves and outer garments, and raw product to cooked product or ready-to-eat products.

Common Daily Sanitation Practices to Prevent Cross-Contamination:

- Adequate separation of raw and cooked or ready-to-eat product handling or processing activities;
- Adequate separation or protection of products in storage;
- Food handling or processing areas and equipment adequately cleaned and sanitized;
- Employee hygiene, dress and hand washing practices;
- Employee food handling practices and utensils; and
- Employee traffic or movement about the plant.

Examples of Poor Employee Practices:

- Handling raw product, then handling cooked product;
- Working near or on the floor, then handling product;
- Handling trash cans, then handling product;
- Returning from restrooms without washing hands;
- Shovel used to handle floor waste, also used to handle product;
- Scratching face, then handling product; and
- Touching unclean cooler door handle, then handling product.

Common monitoring practices are –

- A supervisor or other designated employee should monitor employee hygiene at the beginning of the workday or shift and periodically during the work period.
- Employee practices should also be monitored periodically throughout the work period to ensure that cross-contamination does not occur.

Cross-contamination is an important part of food safety, as it can prevent the spread of harmful bacteria and other pathogens that can cause foodborne illness.

Cross-contamination can occur when harmful bacteria or pathogens from raw or contaminated food are transferred to ready-to-eat foods. This can happen through direct contact, or through the use of contaminated utensils, cutting boards, or other food contact surfaces.

To prevent cross-contamination, it's important to monitor food handling practices and take steps to prevent the spread of harmful bacteria. This includes:

1. *Proper storage: Store raw and ready-to-eat foods separately to prevent cross-contamination. Raw foods should be stored below ready-to-eat foods to avoid any drips or leaks contaminating other foods.*
2. *Cleaning and sanitizing: Clean and sanitize food contact surfaces and utensils between uses to prevent the spread of harmful bacteria.*
3. *Employee hygiene: Employees should wash their hands frequently and follow proper food handling practices to minimize the spread of harmful bacteria.*
4. *Proper cooking temperatures: Cook raw foods to the appropriate internal temperature to kill any harmful bacteria that may be present.*

2. Corrections

Corrections to any unsatisfactory activity or condition which could result in cross-contamination should be made in a timely manner to prevent potential contamination of food and food contact surfaces or when required. When conditions in food handling areas are observed that could lead to cross-contamination, processing or handling activities should stop until the area is cleaned and sanitized and raw and finished product handling or processing activities are adequately separated. If the potential for cross-contamination is observed in storage, cooked or ready-to-eat products should be immediately separated or covered. If contamination is likely, the product should be segregated and held until a decision is made regarding the safety of the product. Based on this decision, the product may be diverted to a safe use, reprocessed, or discarded if contamination has occurred.

Corrections Concerning Cross-contamination:

- Stop activities, if necessary, until the situation is corrected;
- Take steps to prevent contamination from re-occurring;
- Evaluate product safety and, if necessary, divert, reprocess or discard affected products; and
- Document what corrections were taken.

3. Records

The daily sanitation control records should include space for observations and corrections for each of the potential opportunities for cross-contamination that could occur in the plant. The record should allow the individual conducting the monitoring activities to note if conditions are satisfactory or unsatisfactory, when monitoring was conducted and who conducted it. The record should provide space to describe any corrections that are taken when unsatisfactory conditions are observed. Although the recording form may list designated periods for checks (e.g., morning and afternoon shift), concerns for cross-contamination should extend through the entire work day. Records are only required for regularly scheduled monitoring.

Although the recording form may list designated periods for checks (e.g., morning and afternoon shift), concerns for cross-contamination should extend through the entire work day.

4. Understanding cross-contamination

Raw seafood, like other raw foods, contains microorganisms that cause food spoilage and may also contain harmful microorganisms called pathogens that are bacteria or viruses that can cause human illness. These microorganisms can come directly from the marine environment or from contamination that occurs after fish or shellfish products have been harvested. Likewise, people who work in food handling operations can harbor pathogens on their skin and hands, and in their digestive system or respiratory tract. These bacteria and other microorganisms have no means of their own to move around in a food handling or processing plant. They must be physically carried from one place to another.

Hands, gloves, outer garments, utensils, food contact surfaces of equipment that come in contact with waste, the floor, or other unsanitary objects can contribute to product contamination. Employee should be trained on how and when to properly wash and sanitize their hands, gloves, and outer wear, as well as equipment such as shovels and buckets that come into contact with the floor or waste. It is also very important to stress that in order to effectively clean equipment, all residual product must be removed; the equipment must be cleaned with hot water and/or the appropriate detergent; and the equipment must then be sanitized. So, key sanitation conditions for cross-contamination are –

- Employee 'practices'
- Separation of raw and ready-to-eat foods; and
- Plant design

Sources of pathogens that could cross-contaminate finished products:

- Seafood handlers and other plant personnel;
- Raw seafood;
- Equipment or utensils; and
- Processing plant environment.

5. Prevention of cross-contamination

Product flow and plant layout – to ensure that product handling and/or processing procedures prevent the cross-contamination of seafood products by raw materials, ingredients or processing operations. Separate raw and ready-to-eat products -

- When receiving products or ingredients;
- During processing or handling operations;
- During storage; and
- During shipping.

Prevent cross-contamination during processing by:

- Designating separate areas for handling raw and ready-to-eat products;
- Controlling the movement of equipment from one area to another; and
- Controlling the movement of employees from one area to another.

Prevention of cross-contamination:

1. *Separate raw and ready-to-eat foods: Store raw foods, such as meat and poultry, below ready-to-eat foods in the refrigerator to avoid any drips or leaks contaminating other foods.*
2. *Clean and sanitize food contact surfaces and utensils: Clean and sanitize cutting boards, countertops, utensils, and other food contact surfaces between uses to prevent the spread of harmful bacteria.*
3. *Implement good employee hygiene practices: Employees should wash their hands frequently, especially after handling raw foods, and follow proper food handling procedures to minimize the spread of harmful bacteria.*
4. *Cook foods to the appropriate internal temperature: Cook raw foods, such as meat and poultry, to the appropriate internal temperature to kill any harmful bacteria that may be present.*
5. *Use dedicated utensils and equipment for raw foods: Use separate utensils and equipment, such as cutting boards and knives, for raw and ready-to-eat foods to prevent cross-contamination.*
6. *Store raw and ready-to-eat foods separately: Store raw foods, such as meat and poultry, in sealed containers or bags to prevent cross-contamination.*

Employee hygiene and food handling practices - Prevent cross-contamination of seafood products by ensuring that employees follow proper personal hygiene and hand washing practices. Key Employee hygiene practices are -

- Washing hand thoroughly;
- Removing all unsecured jewelry;
- Wearing, where appropriate hairnets, headbands, caps, beard covers or other effective hair restraints;
- Change their footwear before starting work;
- Refrain from eating, drinking, smoking, etc.; and
- Other precautions regarding perspiration, hair, cosmetics, tobacco, chemicals & medicine.

Establishing an effective hand washing program – reason for a hand washing program –

- Many employees do not routinely wash their hands;
- Hand washing is not conducted properly; and
- Many employees do not understand the importance of hand washing.

How to wash hands –

- Remove jewelry;
- Wet hands with warm water
- Lather and rub using warm water;
- Rinse;
- Dry with disposable paper towels; and
- Avoid recontamination.

When to wash arms and hands –

- After touching bare human body parts other than clean hands and clean exposed portions of arms;
- After using the toilet room;
- After coughing, sneezing, using a handkerchief or disposable tissue, using tobacco, eating, or drinking;
- After handling soiled equipment or utensils; and
- During food preparation, as often as necessary to remove soil and contamination and to prevent cross-contamination when changing tasks.

Management role in employee hygiene –

- Set policies that outline personal hygiene expectation;
- Set policies for employees with an illness;
- Training;
- Monitoring and enforcement; and
- Provide adequate employee facilities.

Session Plan

Day: 02	Session: 2.6	Duration: 60 Minutes
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Session Title: Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities.

Learning objectives

At the end of this session, participants will be able to-

- **Understand of hand washing, hand sanitizing, and toilet facilities:** Participants should have a basic understanding of the importance of hand washing, hand sanitizing, and toilet facilities in food safety.
- **Understand procedures:** Participants should be able to identify and understand the key procedures for hand washing, hand sanitizing, and maintenance of toilet facilities.
- **Implement procedures:** Participants should be able to implement proper hand washing and hand sanitizing procedures, as well as maintain toilet facilities in a clean and sanitary manner.
- **Inspect and maintain facilities:** Participants should be able to inspect and maintain hand washing, hand sanitizing, and toilet facilities to ensure they are in good condition and functioning properly.
- **Comply with regulations:** Participants should be able to understand and comply with relevant food safety regulations regarding the maintenance of hand washing, hand sanitizing, and toilet facilities.

By achieving these objectives, participants will improve their practices in maintaining hand washing, hand sanitizing, and toilet facilities, leading to a safer and more hygienic food processing environment.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and hand notes

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities.	Check participants' understanding about the requirement of Hand Washing, Hand Sanitizing, and Toilet Facilities monitoring, corrections and records required. Now present and discuss the topics using PPT slides and the attached hand-out.	30 Minutes
Step-3	Recommended facility for hand washing, hand Sanitizing, and toilet facilities.	Check participants' understanding about the Recommended facility for mentioned subject. Now present and discuss the topics using PPT slides and the attached hand-out. Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	20 Minutes

Energizer

Title: "Clean Hands Song"

Objective: To encourage participants to practice good hand hygiene and make the training session more engaging and fun.

Instructions:

1. Divide the participants into groups of four to six people.
2. Explain that each group will create a short song about the importance of hand washing and sanitizing to prevent the spread of germs and maintain food safety.
3. Give them 10-15 minutes to come up with a catchy tune and lyrics that everyone can sing along to.
4. Once the groups have finished writing their songs, have them perform it in front of the rest of the group.

Encourage everyone to sing and dance along to the different songs.

Example lyrics:

Verse 1:

Wash your hands, wash them right
Use soap and water, scrub with all your might
Clean hands are the key, to food safety
So come on and wash them with me

Chorus:

Clean hands, clean hands, let's all wash them now
Clean hands, clean hands, it's important, take a bow

Verse 2:

After the toilet, before you eat
Wash your hands, it's really neat
Hand sanitizer, can be a friend
Use it when soap and water's at an end

Chorus: Clean hands, clean hands, let's all wash them now
Clean hands, clean hands, it's important, take a bow

Verse 3:

Prevent the spread, of germs galore
Wash your hands, it's not a chore
Food safety, we all need to know
So wash your hands let the germs go

Chorus: Clean hands, clean hands, let's all wash them now
Clean hands, clean hands, it's important, take a bow

Ending: Clean hands, clean hands, we've had some fun
Remember to wash, when you're done!

Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities

Seafood processing facilities generally require a significant amount of manual handling of the products. Cutting, filleting, shucking, peeling, sorting, and packaging are just a few examples of the manual steps that are conducted with worker hands. In some instances, cooked ready-to-eat products such as crab meat and crawfish meat must be handled to remove and to package the meat. Other seafood value-added products (soups, smoked fish, sandwiches, and other specialty items) may also be handled by workers without any further cooking prior to consumption. Unfortunately, human hands are used for more than just handling seafoods by plant workers. They may be used to greet others (handshake), combing hair, scratching, eating during a lunch break, handling unsanitary objects, and going to the toilet. When engaged in these activities, hands may become contaminated with harmful microorganisms and substances.

In a seafood processing environment, it's even more important to maintain hand washing, hand sanitizing, and toilet facilities as seafood is particularly susceptible to bacterial contamination. Here are some additional guidelines for maintaining these facilities in a seafood processing environment:

Hand Washing Facilities

1. Install hand washing facilities at all entry points to the seafood processing area and at regular intervals within the production area.
2. Ensure that hand washing facilities are easily accessible and located near the toilets.
3. Provide a foot-operated or automatic faucet and soap dispenser to minimize hand contact with potentially contaminated surfaces.
4. Install hand dryers or paper towel dispensers near the hand washing facilities.

Hand Sanitizer Facilities

1. Place hand sanitizer dispensers near the hand washing facilities, at the entry to the seafood processing area, and at other key locations within the production area.
2. Make sure that hand sanitizers used are food-grade and safe for use in a seafood processing environment.

Toilet Facilities

1. Ensure that toilet facilities are located near the seafood processing area and are separate from the production area.
2. Provide hand washing facilities near the toilets, and encourage employees to wash their hands after using the toilet.
3. Regularly clean and disinfect toilet facilities, including the toilets, urinals, sinks, and surrounding areas.
4. Ensure that toilet facilities have proper ventilation to minimize odors.

It's also important to regularly train employees on the importance of good hygiene practices and the proper use of hand washing, hand sanitizing, and toilet facilities in a seafood processing setting. Additionally, all employees should follow strict sanitation procedures and wear protective clothing, such as hairnets, gloves, and aprons, to minimize the risk of contamination.

Obviously, hand washing is necessary in a facility that produces raw fishery products. Hand washing and hand sanitizing are necessary for those employees who handle ready-to-eat food, or food packaging materials or food contact surfaces for ready-to-eat products. If hands are not properly washed and sanitized prior to handling seafood products, they may serve as a significant source of pathogenic microorganisms or chemical contamination on finished seafood products. Food processing facilities must establish an effective hand washing program. The availability and maintenance of toilet facilities are essential parts of the hand washing program in order to prevent the spread of filth and pathogenic organisms throughout the plant. Key sanitation concern regarding maintenance of hand washing, hand sanitizing, and toilet facilities are –

- Condition of hand washing facilities;
- Condition of hand sanitizing facilities; and
- Condition of toilet facilities.

1. Monitoring

To support a necessary hand washing program to prevent the spread of filth and potential pathogenic organisms about the processing area or to foods. Recommended monitoring for hand washing, hand sanitizing and toilet facilities are:

- Condition of hand washing facilities;
- Condition of hand sanitizing facilities; and
- Condition of toilet facilities.

2. Corrections

When monitoring of toilet and hand washing facilities indicate that supplies are lacking or they are not functioning properly, the problem should be corrected immediately by fixing broken equipment or replenishing supplies. When inadequate hand sanitizer concentrations are observed, a new hand dip with the proper concentrations should be provided and employees should be required to rewash and sanitize their hands if necessary. Corrections –

- Fix or replenish supplies in toilets and hand wash stations;
- Discard and make up new hand sanitizer solutions if concentration is incorrect;
- Record observations of corrections taken when unsatisfactory conditions are observed; and
- Repair improperly working toilets and
- Maintain worker-toilet ratio.

3. Records

A Daily Sanitation Control Record or log should include space for recording observations that indicate the facility conditions are checked periodically during the day. The records should identify where and when each observation was made, whether the conditions observed were satisfactory or unsatisfactory, the actual concentration of any sanitizers observed, any necessary corrections, and by whom and when the observation was made. The federal HACCP mandate emphasizes the need for “positive” records or actual measures such as the concentration of hand sanitizers. Records for the condition of facilities to clean and sanitize hands, and for toilets:

- Condition and location of hand washing stations or sinks, and toilet facilities;
- Condition and availability of hand sanitizer stations, sinks or dips;
- Concentration of hand sanitizers; and
- Corrections taken when unsatisfactory conditions are observed.

4. Recommendations for hand washing facilities

- Clean at all times;
- Strategically located as per regulations, near bathrooms and entrances to the processing area;
- Dedicated to hand washing only;
- Liquid soap in dispenser;
- Warm water;
- Use of disposable paper towels or air blowers; and
- Adjacent hand sanitizing facilities.

5. Recommendations for hand sanitizing facilities

- Proper sanitizer concentrations with strengths of 20-50 ppm chlorine, or 12.5-25 ppm iodine; (Note: at least 100 ppm recommended by USDA).
- Frequent monitoring and changes to maintain proper concentrations; and
- Conveniently located to encourage employee use but to avoid contact with foods.

6. Recommendations for toilet facilities

- **Hygiene and sanitation:** Maintaining high levels of hygiene and sanitation in toilet facilities is of utmost importance in a seafood processing industry. This includes regularly cleaning and disinfecting surfaces, ensuring adequate hand-washing facilities and supplies, and properly disposing of waste.
- **Proper plumbing and drainage:** Toilet facilities should have proper plumbing and drainage systems to prevent contamination and overflow of wastewater. This can include the installation of traps and separators to prevent cross-contamination between wastewater and processing areas.
- **Access control:** Toilet facilities should be designed and located to prevent access by unauthorized personnel, and to limit cross-contamination between processing areas and toilets. This can include the use of separate entrances and exits, as well as lockable doors.
- **Adequate ventilation:** Toilet facilities should be well-ventilated to prevent the buildup of harmful bacteria and odors. This can include the installation of exhaust fans, windows, or other ventilation systems.
- **Training and education:** Employees should receive training and education on proper hygiene practices, such as hand-washing, and the use of toilet facilities. This can include the use of posters, signage, and training sessions.

Session Plan

Day: 03	Session: 3.1	Duration: 30 Minutes
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Session Title: Review and feedback of previous day's learning

Learning objectives

At the end of this session, participants will be able to:

- Review the previous day's learning and provide feedback;
- Recall their previous discussions and revise and enhance the learning's from the sessions.
- Correct mistakes and reach a consensus by reviewing the previous day's learning

Methodology: discussion and Q&A

Materials: Board, markers, sound system and hand notes

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	▪ Warm-up activities. ▪ Connecting to the current session.	4 Minutes
Step-2	Content	▪ Review of previous day's activities by a trainee. ▪ All participants feedback on topics discussed on the previous day.	20 Minutes
Step-3	Summary	▪ Connecting to the next session. ▪ Feedback on participant's discussion with thanking everyone.	20 Minutes

Session Plan

Day: 03	Session: 3.2	Duration: 60 Minutes
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Session Title: Protection from adulterants

Learning objectives

At the end of this session, participants will be able to-

- Understand the different types of food adulterants and their harmful effects on health
- Familiarize with regulations and laws regarding food safety and standards
- Understand the methods of detecting and preventing food adulteration
- Gather knowledge of Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP)
- Implement effective sanitation and hygiene practices in food handling and production.
- Understand the importance of monitoring, correcting, and maintaining records;
- Familiar how to identify and correct deviations from established food safety procedures
- Understand the role of record-keeping in ensuring food safety and compliance with regulations.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and hand notes

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Possible causes of contamination	Check participants' understanding about possible causes of contamination through question and answer. Now present and discuss the topic using PPT slides and the attached hand-out.	15 Minutes
Step-3	Monitoring, Corrections & Records	Check their understanding monitoring, corrections & records require maintaining regarding adulterants. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	Protection from adulteration	Check participants understanding about the protection procedure for adulterants contamination in seafood. Now discuss the procedures using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Energizer

Title: "Adulterant Alert!"

Objective: To increase awareness and knowledge about common adulterants in the fisheries industry and how to detect them.

Materials needed

- Pictures or samples of common adulterants (e.g. starch, dyes, water, chemicals)
- Small cards or slips of paper with the names of each adulterant written on them
- Timer

Instructions

1. Divide the training participants into small groups of 3-5 people.
2. Hand out the small cards or slips of paper with the names of the common adulterants written on them.
3. Explain that the objective of the activity is to identify as many adulterants as possible within a set time limit.
4. Show the pictures or samples of the adulterants and give a brief description of each one.
5. Start the timer for 5-10 minutes, depending on how much time you have.
6. Each group must work together to match their cards or slips of paper with the corresponding adulterant.
7. Once the time is up, go over the answers as a group and discuss any questions or concerns.
8. Award a prize to the group with the most correct answers.

This energizer activity will not only help participants learn about common adulterants, but also promote teamwork and collaboration among the group. It can also be modified to fit the specific needs and time constraints of the training session.

Protection from Adulterants

Foods processed in unsanitary conditions can be considered adulterated even without any evidence or measures of a contaminant. The fishery product processor needs to be aware of all avenues which would cause a food product to be adulterated such that it may be unsafe to eat due to possible indirect or unforeseen contamination from such things as lubricants, fuel, pesticides, condensate, and residues or aerosols from toxic cleaning compounds. Plant employees must be trained to anticipate and recognize these possible indirect routes of contamination. Any fishery product, component and/or ingredient is deemed to be adulterated-

- If it (food) bears or contains any poisonous or deleterious substance which may render injurious to health;
- If it (food) has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health.

Adulteration: *when the food fails to meet the legal standards set by the government, it is said to have been adulterated.*

Contamination: *The introduction or occurrence of a contaminant in the food or food environment*

Adulterants are a key sanitation concern. Protection is required to ensure that the food, food-packaging material and food contact surfaces are protected from various microbiological, chemical and physical contaminants, such as lubricants, fuel, pesticides, cleaning compounds, sanitizing agents, condensate and floor splash.

1. Possible causes of contamination

Contamination from toxic compounds

- Non-food grade lubricants in seafood products are considered adulterants because they may contain harmful substances.
- Fuel contamination of seafood renders the product adulterated.
- Only approved pesticides and rodenticides should be used to control pests in the plant and these compounds should only be applied as stated on the label.
- Improper use of chemicals, cleaners, and sanitizers can cause adulteration of product directly through splash or spillage, or indirectly through aerosols and mist. Food, food contact surfaces and packaging materials should be removed, covered, or rinsed thoroughly when exposure to contaminants is possible.
- Employees should be alert for toxic aerosols from non-food areas (outside the premises) or adjacent processing rooms.

Contamination from insanitary condensate or standing pools of water

- Contaminated drips or condensate may contain pathogens, chemical residues, and filth that may render a product adulterated.
- The lack of proper ventilation may cause condensation and drips to fall on the product, product contact surfaces and packaging materials.
- Pooled or standing water could splash on the product or product contact surfaces, rendering the product adulterated. Splashing could be caused by foot or vehicle traffic through the standing water.

2. Monitoring

The goal to monitoring this area is to ensure that the food, food-packaging material and food contact surfaces are protected from various microbiological, chemical and physical contaminants.

What to monitor

When determining what to monitor, the seafood processor needs to be aware of how toxic compounds and condensate forming on insanitary surfaces and floor splash could potentially contaminate product. Processors must remember that contaminating product contact surfaces, ingredients and packaging materials is equivalent to contaminating the finished product. Processor needs to monitor any possible adulterant that could contaminate the food contact surfaces including -

- potential toxic compounds; and
- insanitary water (e.g., condensate forming on insanitary surfaces and
- standing pools of water).

Monitoring

A recommended monitoring frequency is at Pre-op or start-up and every four hours thereafter. The processor should be aware of the potential for product adulteration during the entire day's operation from pre-op through processing and sanitation activities. Proper corrections would need to be taken when deviations from the established sanitation practices are noticed.

3. Corrections

Corrections to any unsatisfactory activity which could result in product adulteration should be made in a timely fashion to prevent potential contamination of food, food contact surfaces or packaging materials. The following list outlines some possible corrections to inappropriate activities. Possible corrections are –

- Remove condensate from insanitary surfaces;
- Correct air flow and room temperatures to reduce condensation;
- Install covers to prevent condensation from falling on food, packaging materials or food contact surfaces;
- “Squeegee” floor to remove standing water;
- Direct foot or vehicle traffic around pools of standing water;
- Wash food contact surfaces inadvertently exposed to chemical adulterants;
- Erect screens to protect product when working with a toxic compound in a non-product area;
- Evaluate impact of improper use of toxic compounds to assess whether or not food has been contaminated;
- Reinforce training of employees to correct inappropriate activities; and
- Discard unlabeled chemicals.

4. Records

The records used to document conformance to protecting food, food packaging material, and food contact surfaces from adulteration do not have to be complicated. The general statements on the recording forms can be very inclusive and can appear redundant with other listed monitoring concerns for cleanliness and sanitation. Firms may customize their Daily Sanitation Control Records to specify checks for particular areas or procedures in processing, i.e.,

- no accumulation of condensate on the ceiling;
- location of hand dips or sanitizers relative to food and immediate food contact surfaces to prevent contamination from splashing; and
- no wash waters and residue runoff near food and food packaging.

5. Protection

Protection from adulteration can be considered a 3-step process – before, during and after processing

- **Before Processing:** Before processing begins, it is important to establish a strong food safety management system. This can include the implementation of Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP) programs. These programs help to identify potential sources of contamination and implement preventive measures to reduce the risk of adulteration.
- **During Processing:** During processing, it is essential to monitor and control food safety hazards. This can involve testing raw materials and ingredients, implementing proper sanitation procedures, and maintaining strict temperature control throughout the process. In addition, employees should be trained in proper food handling techniques to minimize the risk of cross-contamination.
- **After Processing:** After processing is complete, the final product should be tested to ensure that it meets food safety standards. This can include microbiological testing, chemical analysis, and sensory evaluations. If the final product is found to be adulterated, it should be properly disposed of and the source of contamination should be identified and addressed to prevent future occurrences.

Protection from adulteration before processing is best accomplished with a written SSOP plan. This plan should describe the requirements for receipt, handling and storage of packaging material, dry food ingredients, and fishery products to ensure they are not adulterated with non-food grade lubricants, fuel, chemicals, pathogens, sanitizer residues, condensate, through insect or rodent infestation, condensate, drip, aerosols, sanitizer residues or other deleterious substances.

The same SSOP plan can detail the required monitoring procedures to prevent adulteration during processing. Routine sanitation monitoring can prevent adulteration during the actual processing procedures. The monitoring records will demonstrate that practices are adequate to prevent and correct potential adulteration.

Finally, prior considerations could influence product adulteration after processing. Selection of packaging materials, package integrity, cleanliness of transport vehicles, and further handling instructions can prevent potential contamination from both biological (microbial and pests) and chemical adulteration by persons and conditions used in transport, storage, display and consumer use.

Condensation

Condensation is a common problem in seafood processing environments and can lead to adulteration. Condensation dripping onto products in food handling or storage areas must also be prevented or controlled. Seafood processing and handling frequently occurs in a “wet” environment and moisture can collect or condense on ceilings, walls, overhead fixtures, pipes, and condenser coils or refrigeration units in coolers. Any area where moisture collects can provide a good environment for spoilage bacteria and pathogens such as *Listeria monocytogenes* to grow and multiply. Cross contamination can occur when dripping water or condensate from the plant facility or equipment is allowed to drip or splash onto ready-to-eat products.

Food handling and storage areas should be routinely monitored to ensure that these products are not exposed to this type of contamination. Drip pans or other devices used to collect condensation in coolers or other areas should be drained frequently and cleaned and sanitized regularly.

Work and storage areas must also be kept clean and free of standing puddles of water that could splash onto products and contaminate them with bacteria. These conditions should be monitored both inside and outside the plant. Monitoring should include loading docks and receiving areas, storage areas and coolers, as well as food-handling and production areas.

Session Plan

Day: 03	Session: 3.3	Duration: 60 Minutes
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Session Title: Proper labelling, storage and use of toxic compounds & control of employee health conditions

Learning objectives

At the end of this session, participants will be able to:

- Understand regulations and laws regarding the labelling, storage, and use of toxic chemicals;
- Demonstrate knowledge of proper handling and storage procedures for toxic chemicals to prevent contamination and harm to employees and consumers;
- Recognize the risks and symptoms associated with exposure to toxic chemicals and know how to respond in an emergency;
- Implement measures to control employee exposure to toxic chemicals, such as using personal protective equipment (PPE);
- Appreciate the importance of regularly monitoring employee health conditions and taking action to prevent illness or injury;
- Establish procedures for reporting and tracking health conditions of employees to ensure early detection and intervention;
- Explain personnel responsibility for labelling and storage.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system with written objectives and training

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Proper labelling, storage and use of toxic compounds	Check participants' understanding about proper labelling, storage and use of toxic compounds through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	15 Minutes
Step-3	Monitoring, corrections & records	Check participants' understanding about regarding monitoring, corrections & records regarding employee health conditions. Now present and discuss the topics consistently using PPT slides and the attached hand-out.	15 Minutes
Step-4	Employee health condition and Management responsibilities	Check participants understanding about the employee health condition required and management responsibilities regarding food processing. Now discuss the topics using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check their understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Energizer

Title: "Toxic Treasure Hunt"

Objective: To increase awareness and knowledge about proper labelling, storage, and use of toxic compounds in the fisheries industry, as well as employee health conditions.

Materials needed:

- Pictures or samples of common toxic compounds (e.g. pesticides, cleaning chemicals, preservatives)
- Small cards or slips of paper with clues or hints about where to find the toxic compounds in the training area
- Timer

Instructions:

1. Divide the training participants into small groups of 3-5 people.
2. Hand out the small cards or slips of paper with clues or hints about where to find the toxic compounds.
3. Explain that the objective of the activity is to locate as many toxic compounds as possible within a set time limit.
4. Show the pictures or samples of the toxic compounds and give a brief description of each one.
5. Start the timer for 5-10 minutes, depending on how much time you have.
6. Each group must work together to find the toxic compounds and write down the correct name of each one.
7. Once the time is up, go over the answers as a group and discuss any questions or concerns.
8. Discuss proper labelling, storage, and use of toxic compounds in the fisheries industry, as well as employee health conditions.

This energizer activity will help participants learn about common toxic compounds, as well as reinforce the importance of proper labelling, storage, and use of these compounds in the fisheries industry. It can also be modified to fit the specific needs and time constraints of the training session

Proper Labelling, Storage, Use of Toxic Compounds and Control of Employee Health Conditions

Chemicals used in most food processing plants include compounds such as cleaners, sanitizers, rodenticides, insecticides, machine lubricants and some food additives. Without them the facility cannot operate. But they must be used wisely and carefully. They must be used according to manufacturer's instructions, have proper labeling, and be stored in a safe manner; otherwise, they will pose a risk of contamination of the food products that the establishment is handling or manufacturing.

1. Proper labelling, storage and use of toxic compounds

1.1 Monitoring

The goal in monitoring this condition is to ensure that the labeling, storage and use of toxic compounds are adequate to protect food from contamination by toxic compounds. Areas of concern include food contact surfaces, packaging materials, and ingredients used both in processing and contained in finished products. Toxic compounds include cleaners, sanitizers, pesticides (for both insects and rodents), machine lubricants and other compounds needed to clean and maintain the seafood processing environment.

Proper labeling, storage, and use of toxic compounds in a seafood processing industry are crucial for the safety of both workers and the final product. Here are some steps to monitor these practices:

- *Proper labeling: All toxic compounds used in the seafood processing industry should be clearly labeled with their proper name, ingredient list, and any warning information, such as PPE requirements, first aid measures, and emergency response information. This information should be easily accessible and clearly visible to employees who handle or may come into contact with these compounds.*
- *Storage: Toxic compounds should be stored in a secure, designated area that is separate from food and food-contact surfaces. This area should be well-ventilated, have proper temperature control, and be accessible only to authorized personnel. The storage area should also be clearly labeled and have emergency response procedures in place.*
- *The use of toxic compounds in the seafood processing industry should be strictly controlled and limited to specific tasks and processes. Employees who handle toxic compounds should be trained on proper handling procedures, including the use of PPE, safe storage and disposal, and emergency response measures.*
- *Monitoring and Record Keeping: Regular monitoring and record-keeping of toxic compound use, storage, and disposal is important for ensuring compliance with food safety regulations and for tracking potential issues. This can include routine inspections of storage areas, documentation of training, and regular review of emergency response plans.*

What to monitor

When determining what to monitor, the seafood processor needs to consider the **proper storage, proper labeling**, as well as **proper usage** of toxic compounds. Processor should monitor –

- Are toxic compounds properly labeled?
- Are toxic compounds properly stored?
- Are toxic compounds properly used?

Proper labeling

The original containers for all chemicals must be labeled to show the name of the manufacturer, instructions for use, and the appropriate approvals. Proper labelling of containers –

- Original container labels should show:
 - Name of compound or solution in the container;
 - Name and address of manufacturers or
 - “Manufactured for” or “Packed for” or “Distributed by” and appropriate approvals; and
 - Instructions for proper use.
- Working container labels must show
 - Name of compound or solution in the container; and
 - Instructions for proper use.

Proper storage

Chemicals used in cleaning and sanitizing treatments, as well as pesticides and rodenticides, must be properly stored in an area of limited access away from food handling or manufacturing. Proper storage of toxic compounds –

- room with limited access;
- segregate food grade from non-food grade; and
- keep away from food equipment, utensils and other food contact items.

These chemicals of concern should not be stored above food, equipment, utensils, or packaging materials. Working containers used for storing these materials, such as cleaners and sanitizers, that have been taken from the bulk supplies must also be sanitary and cleanable. A container previously used to store poisonous or toxic materials must not be used to store, transport, or dispense food or food ingredients, and should also not be used to store cleaners and sanitizers that would come into contact with food-contact surfaces. Likewise, the working container for using cleaners and sanitizers must not be a food container which could inadvertently be used to pack a food product.

Proper use

Only those chemicals that are necessary for the operation and maintenance of a food establishment should be allowed in the facility. The proper use and handling of these chemicals, including cleansers, and detergents, is necessary to reduce the possibility of cross-contamination, adulteration, and ultimately illness. Proper use includes –

- Use of compounds according to manufacturer’s instructions; and
- Procedure will not result in adulteration of products.

1.2 Corrections

Corrections to an unsatisfactory activity involving toxic compounds should be made in a timely fashion to prevent potential contamination of food, ingredients, food contact surfaces or packaging materials. The following list outlines some possible corrections to inappropriate activities:

- Move incorrectly stored toxic compounds to proper storage location;
- Return compounds with inadequate labeling back to supplier;
- Re-label working containers which incorrectly identify compounds contained within;
- Destroy or discard inappropriate or damaged working containers;
- Evaluate impact of improper use of toxic compounds to assess whether or not food has been contaminated (in some cases destruction of the food may be necessary); and
- Reinforce training of employees to correct inappropriate activities.

1.3 Records

The records used to document conformance to the proper labeling, storage, and use of toxic compounds do not have to be complicated. Example 6-10 shows an excerpt from a sample “Daily Sanitation Control Record” which groups concerns for all possible adulterations with monitoring for potential adulteration from toxic compounds. Obviously, potential adulteration from toxic compounds deserves specific attention. The monitoring activity suggested by this form is for a designated plant employee to observe that cleaning compounds, lubricants, and

pesticides are labeled and stored properly. This monitoring activity, which is conducted at pre-op, can be judged satisfactory or unsatisfactory. Obviously, an unsatisfactory rating would require some corrections. Other types of documentation can be just as effective to show compliance with the regulation. Another type of record is a "log" which would contain multiple days of monitoring information on one form. A log, posted by the chemical storeroom, would keep a running history of conformance to this sanitation concern.

1.4 Toxic compounds

The following compounds are regarded as toxic compounds during seafood processing –

- Cleaners and sanitizers
 - Floor and wall cleaners
 - Scouring cleaners
 - Metal cleaners and polishes
 - Degreasers or carbon removers
 - Hand washing compounds
- Water and septic tank additives
- Lubricants
- Pesticides and Rodenticides
- Other compounds –
 - Absorbents or anti slip agents
 - Solvents for cleaning electronic instruments
 - Adhesives and glue
 - First aid supplies
 - Personal care item

During seafood processing, various toxic compounds can be present, including but not limited to:

- **Pesticides:** Pesticides can be present in seafood if the fish were raised in contaminated water sources or if the seafood was exposed to pesticides during storage or transportation.
- **Heavy metals:** Heavy metals, such as mercury and lead, can accumulate in seafood due to pollution of water sources and contamination from human activities.
- **Microbial pathogens:** Microbial pathogens, such as bacteria, viruses, and parasites, can be present in seafood if proper food safety measures are not followed during processing, storage, and handling.
- **Chemical contaminants:** Chemical contaminants, such as polychlorinated biphenyls (PCBs) and dioxins, can be present in seafood due to environmental pollution and exposure to contaminated water sources.
- **Cleaning and sanitizing agents:** If not properly used, cleaning and sanitizing agents, such as chlorine and other chemicals, can leave toxic residue on seafood and cause harm to consumers

2. Control of employee health conditions

This sanitation condition relates to persons who appear to have an illness, wound or other affliction that could be a source of microbial contamination of the food. It is imperative that managers prevent employees from working with foods or food contact surfaces when they are ill or have an infectious wound that has the potential to contaminate the product.

Employee health and hygiene are major components of a firm's sanitation control program. Disease producing organisms can be spread by careless workers handling the food products. In some cases, individuals may be a carrier, which means the individual transmits the organism without actually exhibiting symptoms of the disease. Unless good hygienic habits are practiced, food handled by such a person can, in turn, transmit the disease to unsuspecting consumers.

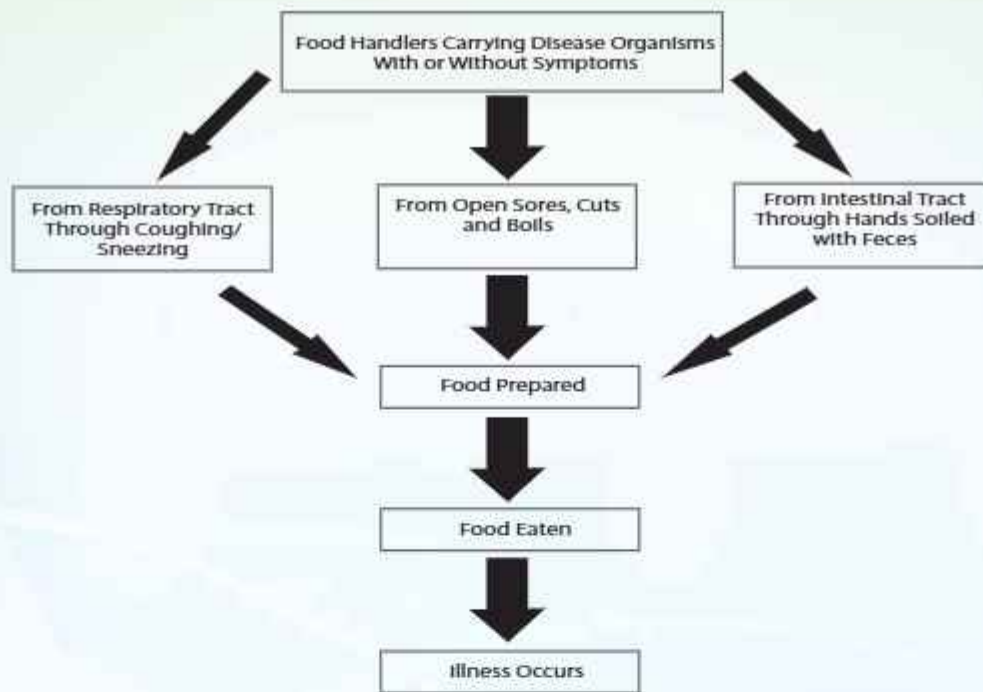


Fig: Route of disease originating from food handler

2.1 Monitoring

The primary goal of monitoring employee health is to control conditions that could result in the microbiological contamination of food, food packaging materials, and food contact surfaces.

Monitoring must be used to observe plant employees for symptoms of illness and for wounds that could potentially contaminate food. Before beginning plant operations, or at the start of each shift, observe employees for signs of illness or wound infections. Supervisors who routinely observe their employees soon become aware of visual clues that an employee may not be feeling well. If a supervisor suspects a problem, then it is prudent to talk with the employee. Common symptoms and conditions to be aware of in processing plant employees –

- Diarrhea;
- Fever;
- Vomiting;
- Jaundice (yellow skin or eyes);
- Sore throat with fever;
- Open skin sores or cuts;
- Boils; and
- Dark urine

Because a person's health status can literally change overnight, it is important to monitor employee health on a daily basis. As suggested previously, it is appropriate to do this before employees begin working. Therefore, this monitoring procedure is one of those that should be performed on a pre-op basis. Employees have responsibility under this sanitation condition.

2.2 Corrections

If an employee is determined to have symptoms of a disease, or infections that could contaminate food products, supervisors should:

- 1) Reassign and relocate an employee to a nonfood processing area or send the employee home until the questionable health condition has changed or tests are negative.
- 2) When lesions are present, an employee should be reassigned, sent home, or an impermeable cover must be placed over the lesions.

2.3 Records

The health of processing employees should be recorded daily on an appropriate section of a daily sanitation control record before the start of production. All unsatisfactory conditions must be recorded with an accompanying correction taken to reduce or eliminate the problem.

2.4 Background

Some pathogens are frequently transmitted by food contaminated by infected persons. The presence of any one of the following signs or symptoms in persons who handle food may indicate infection by a pathogen that could be transmitted to others through handling of the food supply: diarrhea, vomiting, open skin sores, boils, fever, dark urine, or jaundice. However, as mentioned earlier, it is also important to realize that employees may be carriers of certain pathogens (i.e., *Salmonella typhi*, *Shigella* spp., and *E. coli* O157:H7) without exhibiting any symptoms. The failure of food-handlers to wash hands (in situations such as after using the toilet, handling raw fish, cleaning spills, or carrying garbage, for example), wear clean gloves, or use clean utensils is responsible for the foodborne transmission of these pathogens. Non-foodborne routes of transmission, such as from one person to another, are also major contributors in the spread of these pathogens.

A food worker diagnosed with an active case of illness like *Salmonella typhi*, *Shigella* spp., *Escherichia coli* O157:H7, and Hepatitis A caused by any of these pathogens must be excluded or restricted from the food handling areas. The medical consequences of infection with these pathogens can be severe requiring hospitalization and, in some cases, resulting in death. If contaminated products are sold to highly susceptible populations such as the elderly, infants and small children, and persons with immunodeficiency disease, a case of foodborne illness could have more serious medical consequences beyond the mild flu-like symptoms a healthy person experience.

2.5 Management responsibilities

To ensure good hygiene for the food handlers, management should consider the following:

- The health of the employees; special attention should be given to diarrhea, fever, vomiting, jaundice and upper respiratory complaints because these symptoms can spread bacteria and viruses. Employees with open lesions should not be considered for work involving food or food contact surfaces until the cuts or wounds are completely healed. The use of bandages or gloves to cover hand infections is not always sufficient protection to allow resumption of work in the food processing area.
- A clear understanding with the employees that they will not lose their employment if they report they have contracted an illness or communicable disease.
- A posted pictorial, in addition to established company policy, for the employee which indicates how personal health is an essential part of good personal hygiene.
- An emphasis on the maintenance of a high level of cleanliness and good health.
- A regular surveillance of all food handlers for signs of diarrhea, fever, vomiting, jaundice and any evidence of poor personal hygiene.
- A written health policy that requires reporting, work restrictions and exclusions for employees that have symptoms of illness or high-risk conditions.

2.6 Personal responsibilities

The food handler should assure personal hygiene by:

- Reporting any illness to your supervisor before you undertake work with food so that work adjustments can be made to protect the public from the food handler's illness. Your supervisor understands how pathogens can be spread in a processing facility and can make a decision about what location and job in the plant is best for you until your health allows you to resume your previous duties.

- Keeping in a good state of health by the use of proper rest, nutrition, exercise, and physical cleanliness. If exposed to pathogens that cause foodborne illness, a person in good physical health has a greater chance of fighting off infections than does a person in poor health. In turn, good health reduces the chance for transmitting microorganisms in the plant.
- Being health conscious and conscientious in the protection of your health. If you are conscientious about the protection of your own health, it means you are being conscientious about other people's health and you can feel good about the food your company produces.
- Practicing good personal hygiene through daily bathing; use of appropriate deodorants; and proper hair cover and care. These are the steps you need to take for good physical cleanliness.
- Hair in food can be a source of both microbiological and physical contamination. To prevent hair from contaminating food, appropriate hair covers should be worn. This would include wearing hairnets for both men and women, even under hats, and over beards. It is important that hairnets cover all areas of hair. All personnel in a processing area should wear hats. This includes employees, plant managers, and visitors. Hair should be washed at least once a week or more frequently as needed.
- Keeping nails clean and trimmed. As part of a good personal hygiene program you are minimizing the chance for dirt/soil including food particles from accumulating under your nails.
 - Trimming your nails also makes it easier for you to do a good job washing your hands.
 - Avoiding practices such as sneezing, coughing, etc. that could contaminate food.
 - Observing the no smoking, no eating and drinking rules in food preparation and service areas.

Session Plan

Day: 03	Session: 3.4	Duration: 60 Minutes
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Session Title: Exclusion of pests

Learning objectives

At the end of this session, participants will be able to-

- Understand the types of pests and their impact on food safety and quality;
- Demonstrate knowledge of effective pest management practices, such as exclusion, sanitation, and integrated pest management (IPM);
- Familiarize themselves with regulations and laws regarding pest control in food facilities;
- Appreciate the importance of regular inspections and monitoring for pests in the facility;
- Implement procedures for preventing and controlling pest infestations, including proper storage and disposal of food waste;
- Identify and respond to pest infestations and outbreaks;
- Recognize the role of employee education and training in maintaining a pest-free environment.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and hand notes

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Pest control program	Check their understanding about pest control programs. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-3	Authorized use of pesticides	Check participants understanding about authorized use of pesticides. Now give the participants a short overview of authorized use of authorized use of pesticides using PPT slides and attached hand-out.	15 Minutes
Step-4	Monitoring, corrections & records	Check participants' understanding about monitoring, corrections & records regarding pest control. Now present and discuss the topics using PPT slides and the attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Exclusion of Pests

When discussing pests, many people visualize rodents as the primary culprit, but in reality, pests take on many forms in a food processing facility. These include birds; numerous species of flying and crawling insects such as cockroaches, flies, grain beetles, and moths; as well as dogs, cats, raccoons, and various rodents. The impact of pests in the food industry is heavy in monetary terms with the loss of billions of dollars worldwide. While this monetary loss is important, the overriding concern is that food safety will be compromised by pests in food-processing facilities. The presence of pests in a food plant can result in illness to consumers through microbial contamination. Even if the pests do not cause illness, filth such as insect parts, rodent hair and droppings can be distressing for consumers when they discover it in their food. Food borne illnesses that may be passed on by pests are numerous –

- Flies and cockroaches may transmit *Salmonella*, *Staphylococcus*, *C. perfringens*, *C. botulinum*, *Shigella*, *Streptococcus*, and others;
- Rodents are sources for *Salmonella* and parasites; and
- Birds are hosts for a variety of pathogens such as *Salmonella*, *Listeria*, *E. coli* etc.

A pest is any living thing- an animal, or a microorganism that has a negative effect on humans. It can be an unwanted fungi, nematode, microbe (such as bacteria or virus), insect, spider, mite, bird, rodent. In general, pests are unwanted or undesirable.

1. Monitoring

Monitoring must confirm that pests are excluded from relevant areas of the plant to the extent possible and should also confirm that procedures are followed to prevent infestation.

The eighth key sanitary condition is primarily concerned with “pests in the plant,” while the related Good Manufacturing Practices (GMP) address all attributes of pest control. Required monitoring involves a visual inspection for both the presence of pests (for example, domestic animals, insects, rodents and birds), and for current or recent evidence of pests, such as droppings, gnaw marks and nesting material. Typically, monitoring includes observations in the processing, packing and storage areas. To be successful, it should also involve monitoring other related conditions which, if not controlled, could lead to pest problems.

Monitoring frequency will vary depending on what is monitored. Inspection of the physical facility for possible entry points may be a periodic function, perhaps weekly or even monthly.

2. Corrections

When a facility’s monitoring program reveals sanitation-related deficiencies that may introduce a food safety hazard or perhaps impact the wholesomeness of a food product, the facility is required to correct the problem. The presence of pests is a sanitation discrepancy that must be resolved appropriately when identified. This session provides details that should help in establishing criteria for determining other conditions requiring correction. The appropriate solution is often dependent on the situation. Complex or even simple pest problems may require some thought prior to implementing a final solution. For example, in the case of flies in a processing area, a predetermined correction for the short term may be to exterminate existing flies and clean waste handling areas near the plant. A longer-term solution may require installation of air curtains and moving waste storage facilities to an area away from the plant entrance.

In a seafood processing industry, exclusion of pests is a critical component of maintaining food safety and quality. Pests can carry diseases, spread contaminants, and cause physical damage to products and equipment, leading to economic losses and potential harm to consumers. Here are some steps that can be taken to exclude pests in a seafood processing industry:

- **Sanitation and Hygiene:** Maintaining a clean and hygienic environment is essential in excluding pests. This includes regular cleaning and disinfection of facilities and equipment, and ensuring that workers follow good personal hygiene practices.
- **Structural Modifications:** Making physical changes to the building and grounds can help prevent pests from entering. This includes sealing cracks and gaps in walls, repairing holes in screens, and installing door sweeps and weather stripping.
- **Pest Monitoring:** Regular monitoring for pests can help identify infestations early, allowing for quick and effective treatment. This can be done using a variety of methods, such as visual inspections, sticky traps, and pheromone traps.
- **Proper Storage:** Proper storage of food products and supplies can prevent pests from being attracted to the processing facility. This includes storing food products in sealed containers, keeping the storage area clean and free of spills, and regularly inspecting the storage area for signs of pest activity.
- **Integrated Pest Management (IPM):** IPM is a science-based approach that uses a combination of methods to prevent and control pest infestations. This may include using a combination of physical, chemical, and biological controls, as well as monitoring and documenting pest activity.

3. Records

As with each of the eight key sanitation conditions, the observations related to exclusion of pests made while monitoring must be documented and these records must be available. Records provide evidence that the company's sanitation program is adequate, that it is followed and that problems are identified and corrected. As previously indicated, additional monitoring is normally necessary to ensure the exclusion of pests. A record that documents this additional monitoring may identify successful or unsuccessful control strategies, and provide a very useful management tool. It is recommended but is not required.

4. Pest control program

Controlling pests in a food processing facility is essential in order to minimize the transmission of foodborne illnesses caused by microbial contamination. Generally, pest control is a three-phase procedure.

- Elimination of shelter and attractants;
- Exclusion of pests from the food plant; and
- Extermination of those pests that gain entry.

In establishing an exclusionary program for pest control in a food processing facility, there are a number of areas of concern.

- Required Monitoring
 - Presence/Absence of Pests.
- Related Conditions
 - Plant and Grounds;
 - Structure and Layout;
 - Plant Machinery, Equipment and Utensils;
 - Housekeeping;
 - Waste Disposal; and
 - Use of Pesticides and other Control Measures.

Despite every effort to maintain the plant grounds, pests will inevitably try to gain entry and, in many cases, succeed. It is important to assess the facility's capacity for excluding pests.

Pest Control Checklist for-

- *Plant and grounds;*
- *Building/facility;*
- *Plant machinery, equipment and utensils;*
- *Housekeeping;*
- *Waste disposal.*

Example Pest Control Checklist for plant and grounds -

- Are the grounds clear of weeds, tall grass, brush, and debris to minimize cover for pests to approach and enter the facility?
- Is there standing water on the grounds which may attract pests?
- Are traps sufficient in number, well maintained and in good repair?
- Are there signs of the presence of domestic animals or large feral animals (including but not limited to dogs, cats or raccoons)?

Example Pest Control Checklist for building/facility -

- Do windows and doors seal tightly to prevent entry of pests or contaminants?
- Do windows have screens in good repair to keep out insects?
- Are there openings of 1/4-inch or greater that will allow entry of rodents and insects?
- Are drains properly cleaned and free of buildup that may act as an attractant to rodents and other pests?
- Is there sufficient clearance space (six-inch minimum between walls and equipment) to inhibit rodent activity?
- Are drain covers in good repair and properly fitted?

Example Pest Control Checklist for plant machinery, equipment and utensils -

- Are machinery, equipment and utensils properly cleaned and sanitized to eliminate the build-up of food or other static materials that may act as an attractant to pests?
- Is there sufficient space along the process line to allow for proper cleaning and sanitizing?
- Are there any "dead spaces" which may allow for the build-up or collection of food and other debris acting as attractant or harborage of insects and bacteria?
- Are blacklight units maintaining the proper light intensity levels to attract flying insects?
- Are blacklight electrocution devices properly set up?
- Are the blacklight electrocution device catch basins cleaned out regularly?

Example Pest Control Checklist for housekeeping -

- Is trash, debris and clutter picked up eliminating cover for pests?
- Are personnel locker rooms and break rooms cleaned and sanitized to inhibit the attractions of rodents and other pests?
- Are there signs of rodent, insect, or bird habitation, e.g., droppings, hair, feathers, gnaw marks, grease runs from rodent activity along walls, urine/ammonia odors?
- Have previously noted indicators of pest habitation been cleaned up in order to note any new or continued activity?

Example Pest Control Checklist for waste disposal -

- Is waste material properly collected, stored and disposed of in order to inhibit the attraction of rodents and other pests?
- Are waste bins, tubs and/or dumpsters properly cleaned and sanitized in order to inhibit the attraction of rodents and other pests?

5. Authorized Use of Pesticides

Awareness of the regulatory requirements relating to the authorized use and handling of chemicals and poisons used in the control of pests is very important.

The use of pesticides may be separated into two categories:

“General use insecticides” are those that will not ordinarily have an adverse effect on either the user or the environment when properly used. “Restricted use insecticides” are those that may have an adverse effect on the user or environment through exposure, unless applied under controlled conditions by or under the supervision of a trained, certified person.

General Standards for Applicator Certification:

- Label and labeling comprehension;
- Safety;
- Environmental factors and the consequence of use and misuse of the pesticide;
- Knowledge of pests; and
- Knowledge of pesticides and types of formulations, including the hazards associated with residues.

Session Plan

Day: 03	Session: 3.5	Duration: 60 Minutes
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Session Title: Seafood Safety Hazards: Pathogens

Learning objectives

At the end of this session, participants will be able to-

- Understand the types of seafood-borne pathogens and their potential health risks;
- Demonstrate knowledge of the sources and transmission of seafood-borne pathogens;
- Familiarize themselves with regulations and laws regarding seafood safety and hygiene;
- Appreciate the importance of proper storage, handling, and cooking of seafood;
- Implement effective sanitation and hygiene practices in seafood handling and production;
- Recognize the role of temperature control in preventing the growth of pathogens in seafood;
- Understand the concepts of Hazard Analysis and Critical Control Points (HACCP) for seafood safety;
- Appreciate the importance of monitoring and testing for pathogens in seafood;
- Respond to and report incidents of seafood-borne illness effectively;
- Develop Control strategy of pathogen.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Seafood Safety Hazards	Check participants' understanding about pathogen as seafood safety hazards through question and answer. Now present and discuss seafood safety hazard, category of hazard using PPT slides and the attached hand-out.	20 Minutes
Step-3	Seafood Safety Hazards: Pathogens	Check participants' understanding about pathogen as seafood safety hazards through question and answer. Now present and discuss seafood safety hazard: pathogen using PPT slides and the attached hand-out.	30 Minutes
Step-4	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Energizer

Title: "Pathogen Puzzle"

Objective: To increase awareness and knowledge about common seafood pathogens and how to prevent contamination.

Materials needed:

- Pictures or samples of common seafood pathogens (e.g. Vibrio, Salmonella, Listeria)
- Small cards or slips of paper with clues or hints about each pathogen
- Puzzle pieces (can be paper or cardboard cutouts)

Instructions:

1. Divide the training participants into small groups of 3-5 people.
2. Hand out the puzzle pieces to each group and explain that the objective of the activity is to put together a puzzle of a common seafood pathogen.
3. Show the pictures or samples of the common seafood pathogens and give a brief description of each one.
4. Hand out the small cards or slips of paper with clues or hints about each pathogen.
5. Each group must work together to match their clues or hints with the corresponding pathogen.
6. Once they have identified the pathogen, they must put together their puzzle pieces to form the complete picture.
7. Once all groups have completed their puzzle, go over the answers as a group and discuss any questions or concerns.
8. Discuss prevention strategies for each pathogen and the importance of maintaining seafood safety.

This energizer activity will help participants learn about common seafood pathogens and how to prevent contamination. It can also promote teamwork and collaboration among the group. The puzzle pieces can be customized to fit the specific needs and time constraints of the training session.

Seafood Safety Hazards: Pathogens

A hazard is defined as any biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of control(s). The term hazard, when used in the context of HACCP, is limited to food safety concerns that could cause consumer illness or injury. The rationale for implementing a seafood HACCP program is to prevent the potential seafood safety hazards that are “reasonably likely to occur” and could cause disease or health injury if not adequately controlled.

Hazard: A biological, chemical or physical agent in food with the potential to cause an adverse health effect.

Pathogens: Pathogens are microorganisms such as bacteria, viruses, fungi, or parasites that can cause disease in humans, animals, or plants. These organisms can be spread through contaminated food, water, air, or physical contact with an infected person or animal. Some common pathogens include Salmonella, E. coli, Listeria, Norovirus and Influenza. The presence of pathogens in food processing plants can pose a significant risk to public health, so it's important to implement effective food safety measures to prevent their spread.

Pathogen in the oldest and broadest sense is any organism or agent that can produce disease. A pathogen may also be referred to as an infectious agent, or simply a germ.

1. Categories for seafood safety hazards

There are two different categories of potential seafood safety hazards that all seafood processors must consider and evaluate.

Species-related hazards are unique hazards that are associated with specific types or species of finfish and shellfish. Each species or type of finfish and shellfish may have unique potential seafood safety hazards associated with the water that they live in, their feeding habits, whether they are wild-harvested or farm-raised, or other unique characteristics.

- Pathogens from the Harvest Area (molluscan shellfish only)
- Parasites (finfish and shellfish)
- Natural Toxins (finfish and shellfish)
- Scombrototoxin or Histamine (certain species of finfish only)
- Environmental Chemical Contaminants (wild and farm raised finfish and shellfish)
- Aquaculture Drugs (farm raised finfish and shellfish only)

Process-related hazards are potential food safety hazards that may be associated with specific types of finished fishery products as a result of the finished product form, the package type, the method of distribution and storage, or the processing methods that are used.

These potential hazards must be evaluated for specific product types or processing methods regardless of the species of finfish or shellfish used in the product. (Fish and Fishery Products Hazards and Controls Guidance June 2022 Edition- Chapter 3: Potential Species-Related and Process-Related Hazards)

- Pathogenic bacteria growth (Includes general pathogens, Salmonella spp, C. botulinum and S. aureus)
- Pathogen survival through cooking or pasteurization
- Pathogen survival through processes that do not use heat
- Pathogen contamination after cooking or pasteurization processes
- Food allergens
- Food intolerance substances
- Metal and glass inclusion

2. Pathogens in seafood

All foods can contain living organisms too small to be seen with the naked eye. They are called by the generic term “microorganisms.” Microorganisms are classified into various groups including: yeasts, molds, bacteria, and viruses.

Bacterial pathogens

Bacterial hazards are defined as those bacteria that, if they occur in food, may cause illness in humans, either by infection or intoxication.

Foodborne infections are caused by consuming live pathogens that grow within the body, usually in the intestinal tract. Foodborne infections are caused by organisms such as *Salmonella* spp., *Shigella* spp., and *Listeria monocytogenes* to mention a few.

The other kind of bacterial hazard is **foodborne intoxication**, which is a condition caused by swallowing preformed toxins (i.e., toxins produced by microorganisms in the food before it is eaten). Foodborne intoxications can be caused by certain types of bacteria such as *Staphylococcus aureus* or *Clostridium botulinum* that can produce staph enterotoxins or *Botulinum neurotoxins*, respectively.

Control strategies for bacterial pathogens

Source controls – Live clams, oysters and mussels feed by pumping water through their system and filtering out algae and other microorganisms. If pathogens are present at high levels in the water, the number of pathogens in the clam, oyster or mussel will also be high. Because these shellfish are commonly eaten raw, it is essential that they only be harvested from waters that do not contain high levels of pathogens to minimize risk.

Eliminate or kill bacterial pathogens – An effective cooking procedure can significantly reduce or eliminate the pathogens. Improper cooking could allow the pathogens to survive in amounts that still pose a hazard. Selection of appropriate controls must always consider potential bacteria survival. Pathogens can also be effectively killed or reduced by pasteurizing or using other non-heat lethal treatments.

Prevent bacterial pathogen growth – In some cases, seafood is eaten raw or as ready-to-eat (RTE) products that do not require cooking just before consumption. Pathogen growth can be prevented or reduced to an acceptable level by freezing, refrigeration, minimizing exposure to temperatures above 4°C, drying or salting.

Control strategies

- **Source controls** for high risk products like raw molluscan shellfish require that they only be harvested from waters that do not have elevated levels of pathogens
- **Prevent or reduce pathogen growth** to an acceptable level by: freezing, refrigeration, minimizing exposure to temperatures above 4°C, drying, or salting
- **Eliminate or kill pathogens** by cooking, pasteurizing, or using other non-heat lethal treatments

Controls for specific types of bacterial pathogens

Some pathogens may grow under unique conditions or may be particularly resistant to environmental conditions. Bacterial hazards can be grouped into sporeformers and non-sporeformers. Certain types of bacteria (e.g., *Clostridium* spp. and *Bacillus* spp.) pass through a dormant stage in their life cycle called a spore. When a bacterium exists as a spore, it is very resistant to chemicals, heat and other treatments that would normally be lethal to non-sporeforming bacteria.

Clostridium botulinum (Sporeformer) - found throughout the environment and has been isolated from soil, water, vegetables, meats, dairy products, ocean sediments, the intestinal tracts of fish, and the gills and viscera of crabs and other shellfish. *C. botulinum* is a sporeforming bacterium that grows in the absence of air.

These characteristics allow it to survive normal cooking temperatures and to grow in a vacuum-packaged and modified-atmosphere environment. *C. botulinum* produces a powerful neurotoxin that causes botulism. Growth is necessary for *C. botulinum* to produce toxin. Symptoms include diarrhea, vomiting, abdominal pain, nausea and weakness. These are followed by double, blurred vision and dilated, fixed pupils. In severe cases, paralysis of the muscles responsible for breathing can cause death. Some controls in seafood are destroy spores during processing (e.g., thermal processing [canning] or proper cooking); prevent potential growth by proper salting, drying, or pickling (acidification); proper refrigeration or packaged in anaerobic conditions (limited oxygen) and packaging in permeable film (enough oxygen).

***Bacillus cereus* (Sporeformer)** - spores can germinate and grow in the presence or absence of oxygen. If allowed to grow, it can produce heat stable *Bacillus* toxins that cannot be destroyed by routine cooking. They occur in soils and can be easily transmitted to many types of foods. They have been associated with illnesses involving cooked vegetables and meats, rice, and dairy products. *B. cereus* can cause diarrhea and abdominal pains or onset of nausea and vomiting. Can be controlled in seafood by proper sanitation to prevent contamination (product source, process facilities and personnel); proper chilling and proper refrigeration (prepared/RTE).

***Listeria monocytogenes* (Non-sporeformer)** - widespread in nature and has been isolated from soil, vegetation, marine sediments and water. Cause of listeriosis and mild flu in humans. Severe listeriosis can cause meningitis, abortions, septicemia and a number of other maladies, some of which may lead to death. Can be controlled in seafood by proper sanitation to prevent contamination (product source, process facilities and personnel); proper refrigeration; proper cooking and prevent cross-contamination after cooking.

***Salmonella spp.* (Non-sporeformer)** - naturally found in the intestinal tracts of mammals, birds, amphibians, and reptiles, but not in fish, crustaceans or mollusks. *Salmonella* is transferred to seafood through sewage pollution of the harvest environment or by contamination after harvest, causes nausea, vomiting, abdominal cramps and fever. Can be prevented in seafood by proper sanitation to prevent contamination (product source, process facilities and personnel); proper refrigeration; proper cooking and prevent cross-contamination after cooking.

***Staphylococcus aureus* (Non-sporeformer)** - Humans and animals are the primary reservoirs or source for *S. aureus*. Natural sources include the nose, throat and on the hair and skin of healthy individuals. However, the bacteria can also be found in air, dust, sewage and surfaces of food processing equipment. *S. aureus* can produce a toxin if allowed to grow in food. The toxin is not destroyed by cooking or other thermal process (i.e. canning processes). Can be controlled by minimizing time/temperature abuse of seafood by proper sanitation to prevent contamination (product source, process facilities and personnel); proper refrigeration; proper cooking and prevent cross-contamination after cooking.

***Vibrio cholerae* (Non-sporeformer)** - found in estuaries, bays, and brackish waters. It is naturally occurring and is not necessarily related to sewage contamination. *V. cholera* tends to be more numerous in the environment during warmer months. Causes abdominal discomfort and mild diarrhea. As the illness progresses, symptoms may include watery diarrhea, abdominal cramps, vomiting and dehydration to death. Can be prevented in seafood by thorough cooking and preventing cross-contamination.

***Vibrio parahaemolyticus* (Non-sporeformer)** - naturally occurring in estuaries and other coastal areas throughout most of the world. In most areas, *V. parahaemolyticus* is more numerous in the environment during the warmer months and, as a result, most outbreaks occur during the summer. Can be controlled by thorough cooking, preventing cross-contamination and time/temperature abuse.

***Vibrio vulnificus* (Non-sporeformer)** - naturally occurring marine bacterium. *V. vulnificus* requires salt for survival and is commonly isolated at salinities of 7 parts per thousand (ppt) to 16 ppt. The numbers of the bacterium in the environment are highest during the warmer months of April through October. The most common symptoms include skin lesions, septic shock, fever, chills and nausea. Abdominal pain, vomiting and diarrhea are less frequent. Can be controlled by thorough cooking, preventing cross-contamination and refrigeration.

Viral pathogens

Like other microorganisms, viruses exist everywhere. They are very small particles that cannot be seen with a traditional microscope and cannot reproduce by themselves. Viruses exist in foods without growing, so they need no food, water or air to survive. They do not cause spoilage. Viruses cause illness by infection. They can infect living cells and reproduce inside the host cell. Viruses only grow once they enter a suitable host, and only some viruses consider humans a suitable host. Viruses can survive in human intestines, contaminated water, and frozen foods for months. Viruses can be transmitted to infect consumers by contact with people, food or contaminated waters. Transmission of viruses to foods is usually related to poor hygienic practices or harvest from non-approved, contaminated waters (e.g., illegal shellfish harvest). The following are examples of viral hazards that can be found in seafood.

Hepatitis A Virus - survive better at low temperatures and are killed at high temperatures. As a result, most outbreaks of hepatitis occur during winter and early spring. Viruses can remain alive for long periods of time in seawater and have been shown to survive over one year in marine sediments. Symptoms include weakness, fever, abdominal pain and in progress jaundiced. Can be controlled by thorough cooking and preventing cross-contamination.

Norovirus - considered a major cause of nonbacterial intestinal illness (gastroenteritis). Illness from Norovirus has been associated with eating raw and steamed clams, oysters and cockles. Norovirus causes nausea, vomiting, diarrhea, abdominal cramps, and occasionally fever. Hazards can be prevented by properly cooking and preventing cross-contamination.

Parasites

Parasites are organisms that need a host to survive, by living on the host or within the host. There are two types of parasites that can infect people through food or water: parasitic worms and protozoa. Parasitic worms include roundworms (nematodes), tapeworms (cestodes) and flukes (trematodes). These worms vary in size from barely visible to several feet in length.

A parasite is an organism that lives in or on another organism (the host) and benefits at the host's expense. Parasites can cause harm to their hosts by taking nutrients, damaging tissues, or transmitting diseases. There are many different types of parasites, including protozoa, helminths, arthropods, and fungi. Some parasites, such as tapeworms and lice, can be found in food processing plants and can pose a risk to food safety if they are not properly controlled.

Flukes (Flatworms) - Flatworms is the common term used to refer to a large number of potential parasitic worms that appear as small, flat, and slender worms and described according to the human organs they can infect, e.g., liver flukes, lung flukes, and intestinal flukes. Collectively, they cause the largest number of seafood-borne parasitic infections in the world. These infections involve consumption of raw, fermented, undercooked or improperly pickled fish, crustaceans, and some mollusks usually taken from freshwater sources that involve the life-cycle of the parasite. Proper freezing, and heating or cooking can be effective controls to prevent infections.

Session Plan

Day: 03	Session: 3.6	Duration: 60 Minutes
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Session Title: Seafood Safety Hazards: Species & Process related hazards

Learning objectives

At the end of this session, participants will be able to:

- Understand the different types of seafood-related hazards, including species-related hazards and process-related hazards;
- Describe the potential health risks associated with consuming seafood;
- Familiarize with Environmental & chemical contaminants, Scombrototoxin (Histamine poisoning), aquaculture drugs;
- regulations and laws regarding seafood safety and hygiene;
- Understanding the importance of properly identifying seafood species and verifying their origin;
- Knowledge of the potential hazards in seafood processing and preservation methods;
- Implementing effective control measures to prevent and mitigate seafood-related hazards;
- Understanding the role of traceability and labelling in seafood safety;
- Knowledge of how to respond to and report incidents of seafood-borne illness and contamination;
- Understanding the importance of continuous monitoring and improvement of seafood safety practices.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Species related hazards and environmental and chemical Contaminants	Check participants' understanding about species related hazards and contamination through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	15 Minutes
Step-3	Aquaculture drugs & Scombrototoxin	Check their understanding about hazards due aquaculture drugs & scombrototoxin through question and answer. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-4	Process related hazards	Check participants understanding about the common process related hazards through question and answer. Now give the participants a short overview about the relationship using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Seafood Safety Hazards: Species & Process Related

1. Species-related hazards associated with the harvest or growing area

Natural toxins may be produced by naturally occurring algae that grow rapidly in some areas when conditions favor their growth. Some species of fish and shellfish may then accumulate these toxins at levels that can cause human illness. Likewise, environmental chemical contaminants or pollutants may be present in some waters where fish and shellfish live. In addition, if drugs used to treat disease are not used properly, they could also impact human health.

Species-related hazards:

- **Histamine toxicity:** Certain species of fish, such as tuna, mackerel, and mahi-mahi, contain high levels of histidine, an amino acid that can form histamine when exposed to certain bacteria. If these fish are not stored or processed properly, histamine levels can rise to dangerous levels, causing histamine toxicity in consumers.
- **Ciguatera toxin:** This toxin is produced by microalgae and can accumulate in certain reef fish, such as barracuda, snapper, and grouper. When consumed, it can cause symptoms such as nausea, vomiting, diarrhoea, and neurological symptoms.
- **Scrombold toxin:** This toxin is produced by bacteria in raw or undercooked fish, such as tuna and mackerel, and can cause symptoms similar to histamine toxicity.

Natural Toxins

Marine biotoxins (natural toxins) represent a significant threat to human health when humans consume fish and fishery products that contain certain small amounts of these toxins. The marine biotoxins comprise many distinct compounds, all produced by species of naturally occurring marine algae. Algae are at the base of the marine food chain. Consequently, the biotoxins produced by some algae are collected and concentrated through the food chain (e.g., mollusks, crustaceans and finfish) and ultimately are consumed by humans.

There are several recognized marine shellfish biotoxins; e.g. paralytic shellfish poisoning (PSP), neurotoxic shellfish poisoning (NSP), diarrhetic shellfish poisoning (DSP), and amnesic shellfish poisoning (ASP).

Amnesic Shellfish Poisoning (ASP) - primarily caused by contaminated molluscan shellfish, primarily from cold water regions. The shellfish become contaminated with domoic acid produced by dense growths of certain algae in the genus *Pseudonitzschia*. The only shellfish implicated in cases of ASP have been mussels. Controls for amnesic shellfish toxins in seafood largely depend on harvest of approved products from approved waters.

Diarrhetic Shellfish Poisoning (DSP) - caused by contaminated molluscan shellfish. Filter-feeding mollusks can accumulate toxins even at algae concentrations below that necessary to discolor the water. Mussels, oysters, hard clams and soft-shell clams have been implicated in cases of DSP. Controls for diarrhetic shellfish toxins in seafood largely depend on harvest of approved products from approved waters.

Neurotoxic Shellfish Poisoning (NSP) - *Gymnodinium breve* was first recognized as causing NSP in the mid-1960s. Blooms of these algae usually result in fish kills and can make shellfish toxic to humans. The blooms generally begin offshore and move inshore. *G. breve* produces three known toxins (brevetoxins). Controls for neurotoxic shellfish toxins in seafood largely depend on harvest of approved products from approved waters.

Paralytic Shellfish Poisoning (PSP) - There are many species of toxic algae that cause paralytic shellfish poisoning. These include algae in the genus *Alexandrium*, *Pyrodinium* and *Gymnodinium*. PSP can be caused by a combination of any of 18 toxins (saxitoxins), depending on the species of algae, geographic area and type of shellfish involved. Controls for paralytic shellfish toxins in seafood largely depend on harvest of approved products from approved waters.

Ciguatera Fish Poisoning (CFP) - Although it originates in a form of natural algae, the food route to humans is by toxin accumulation in certain fish harvested from certain areas. By eating toxic algae, certain species of tropical and subtropical fish can become toxic to humans. The algae species most often associated with CFP is *Gambierdiscus toxicus*, but others are occasionally involved. There are at least four known toxins that concentrate in the viscera, head or central nervous system of affected fish.

- Do not process certain fish harvested from waters that have been designated as potentially ciguatoxic

Other Marine Toxins

Tetrodotoxin (puffer fish) - Puffer fish, also called fugu or blowfish, contain the potent toxin, tetrodotoxin. It is unclear whether the fish itself produces the toxin, or like ciguatera, it is introduced to the fish by eating toxic algae. The primary control is avoidance of potential tetrodotoxic puffer fish.

- Do not process certain fish (puffer fish) that have been designated as potentially tetrodotoxic

Gempylotoxins – Gempylids produce an oil that has a purgative effect. The diarrhea caused by eating the oil contained in the flesh and bones of gempylid fish develops rapidly and is pronounced but generally without pain or cramping.

2. Environmental Chemical Contaminants

Fish and shellfish may be harvested from waters that are exposed to varying amounts of environmental contaminants. Industrial chemicals, pesticides, and many toxic elements may accumulate in fish at levels that can cause public health problems. Of greatest concern are fish harvested from freshwater, estuaries, and near shore waters rather than from the open ocean. Pesticides and herbicides used near aquaculture operations are also of concern. Because these hazards are unique to the fish and shellfish harvested from these areas, this is a hazard only associated with species that are grown and harvested in these areas. Producer quality assurance programs provide useful information for avoiding potential contaminants. Controls are necessary to prevent potential hazardous chemical contaminants.

- Do not harvest or sell fish or shellfish from waters that have been closed by central or local authorities due to environmental pollution.
- Properly locate and monitor aquaculture farming operations to prevent pond contamination from runoff, and previous or new human activities.

3. Aquaculture Drugs

Animal drugs may be used in the raising of aquatic species to: 1) treat or prevent disease, 2) control parasites, 3) affect reproduction, and 4) tranquilize. Illegal residues of drugs may occur in aquaculture species because of the use of unapproved drugs, use of drugs not in accordance with the approved labeling directions, failure to follow approved withdrawal times, or use of general-purpose chemicals not labeled or approved for drug use. There are only a few approved drugs for aquatic species. Producer quality-assurance programs provide information and guidance for proper use of approved compounds and record-keeping practices that can be referenced in processor HACCP plans. Some controls for use of aquaculture drugs are –

- When necessary, only use certain controlled drugs in the manner prescribed by a recognized veterinary expert
- Test for any excessive residuals in final products

4. Scombrototoxin (Histamine poisoning)

Another species-related hazard associated with certain types or species of finfish. Scombroid poisoning, also known as histamine poisoning, is caused by eating fish of certain species that have undergone some degree of spoilage by naturally occurring bacteria. These bacteria produce an enzyme that reacts with natural components (amino acids) of the fish flesh to produce histamine and biogenic amine compounds (putrescine and

cadaverine). Certain species of fish are more likely to accumulate levels of these toxins that can cause human illness if they are not handled properly or are not kept cold enough from the time of harvest until they are consumed. Fish that have been involved in scombroid poisonings include tuna, mahi-mahi, bluefish, sardines, amberjack and mackerel. The toxin is not eliminated or the amount present in the fish is not reduced by cooking or canning. Temperature controls from the moment of harvest through processing, storage and product distribution can control potential scombrototoxin in seafood.

The histamine-forming bacteria usually grow rapidly only at high temperatures. At 32.2°C, unsafe levels of histamine may appear within six hours. At Some controls for use of aquaculture drugs:

- When necessary, only use certain controlled drugs in the manner prescribed by a recognized veterinary expert
- Test for any excessive residuals in final products the toxic conditions may appear within 24 hours.

- Temperature controls from the moment of harvest through processing, storage, and product distribution.

5. Process-related hazards

Pathogen growth or elimination is a process-related hazard because it is associated with the finished product form, the package type, the method of distribution and storage, or the processing methods that are used.

Process-related hazards:

- **Cross-contamination:** This occurs when bacteria or other pathogens from raw seafood products contaminate ready-to-eat seafood products. This can occur during processing, storage, or preparation if proper hygiene and sanitation practices are not followed.
- **Improper cooking:** Seafood products must be cooked to a safe minimum internal temperature to destroy harmful bacteria and parasites. If seafood is undercooked or not cooked to the correct temperature, it can pose a risk to consumer health.
- **Poor storage:** Seafood products must be stored at the correct temperature to prevent the growth of harmful bacteria and the formation of toxins. If seafood is not stored properly, it can pose a risk to consumer health.

Food Intolerance Substances (FIS)

Food intolerance substances, or FIS, include various compounds or ingredients that are approved or recognized for use with seafood products or processes, but they must be used in an appropriate or specified manner based on good manufacturing practices, regulatory limits and/or expert advice. Improper use or use of compounds from improper sources can result in hazards that cause intoxication, allergic-type reactions or food intolerances. Some intentionally added chemicals used with seafood include food additives for preservation or processing aids, nutritional additives, and color additives.

Examples of Food and Colour Additives

- Preservatives (e.g. nitrite, sulphites)
- Nutritional supplements (e.g. vitamins)
- Colour Additives (FD&C Yellow No. 5)

Controls for intentionally added ingredients in seafood:

- Use proper type and amount of ingredients
- Label product to inform consumers (e.g., sulphites)

Food Allergens

A number of foods contain allergenic proteins that can pose a health risk to certain sensitive individuals. If these foods are part of, or are directly added to your fishery product, you must ensure that the product is properly labeled.

- Most common food allergens: Milk, Peanuts, Soybeans, Eggs, Tree Nuts, Wheat, Fish, Crustaceans

Allergen Cross-Contact

The controls for informing consumers about the presence of allergens in a processed seafood product are not designed to prevent the unintentional introduction of allergenic proteins from such foods into your fishery product because of cross-contact (e.g. use of common equipment, improper production scheduling, or improper use of rework material). Unintentional introduction of allergenic proteins must be controlled through a rigorous sanitation regime, either as part of a Pre-requisite program or as part of HACCP itself. The basic controls for allergens involve product declarations and monitoring to prevent cross-contact among foods.

- Proper labeling to inform consumers.
- Implement proper pre-requisite programs and a strong sanitation program to avoid cross-contact for all allergens.

Glass and Metal Hazards

Hazards also include any potentially harmful extraneous matter not normally found in food. When a consumer mistakenly eats the foreign material or object, it is likely to cause choking, injury or other adverse health effects. Physical hazards are the most commonly reported consumer complaints because the injury occurs immediately or soon after eating, and the source of the hazard is often easy to identify. Glass fragments originating from other sources must be addressed, where applicable, in a Pre-requisite sanitation program.

Metal-to-metal contact—especially in mechanical cutting and blending operations, and with equipment that has parts that can break or fall off, such as wire-mesh belts—can introduce metal fragments into products. This hazard can be controlled by subjecting the product to metal detection devices or by regular inspection of at-risk equipment for signs of damage.

Session Plan

Day: 04	Session: 4.1	Duration: 30 Minutes
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Session Title: Review and feedback of previous day's learning

Learning objectives At the end of this session, participants will be able to: ▪ Review the previous day's learning and provide feedback; ▪ Recall their previous discussions and revise and enhance the learnings from the sessions. ▪ Correct mistakes and reach a consensus by reviewing the psrevious day's learning.	
Methodology: Discussion and Q&A	Materials: Board, markers, sound system, handouts of the previous day's training material, Pen and paper for note-taking

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	▪ Warm-up activities. ▪ Connecting to the current session. ▪ Start the session by welcoming the participants and briefly reminding them of the key topics covered in the previous day's training.	4 Minutes
Step-2	Content	▪ Review of previous day's activities by a trainee. ▪ Ask the participants to share their thoughts and feedback on the previous day's learning, and encourage them to ask any questions or clarify any doubts. ▪ After the review period, ask participants to share their key takeaways and observations from the previous day's training.	20 Minutes
Step-3	Summary	▪ Feedback on participant's discussion with thanking everyone. ▪ Summarize the session by reviewing the key points and takeaways from the previous day's training and highlighting any areas that require further review or clarification. ▪ Connecting to the next session.	6 Minutes

Session Plan

Day: 04	Session: 4.2	Duration: 60 Minutes
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Session Title: Pre-requisite programs for HACCP implementation

Learning objectives

At the end of this session, participants will be able to-

- Understand the concept of pre-requisite programs for Hazard Analysis and Critical Control Points (HACCP) implementation
- Familiarize with the key components of pre-requisite programs, including Good Manufacturing Practices (GMP), Sanitation Control Procedures (SCP), Sanitation Standard Operating Procedures (SSOPs), and Personnel Hygiene;
- Demonstrate knowledge of how to develop and implement effective pre-requisite programs;
- Understand the role of pre-requisite programs in maintaining food safety and quality;
- Understand the importance of continuous improvement of pre-requisite programs;
- Demonstrate knowledge of how pre-requisite programs support the implementation of HACCP;
- Understand the interrelationship between pre-requisite programs and HACCP
- Knowledge of how to monitor and evaluate the effectiveness of pre-requisite programs.
- Understand and explain Employee training & records;
- Understand and explain GMP & and
- Understand and explain HACCP versus SCP.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	05 Minutes
Step-2	Employee training & records	Introduce the topics of employee training, GMP, SCP, and HACCP, and explain their importance in ensuring safe seafood. Explain the requirements for employee qualifications and training, and the importance of documenting and keeping records of training. Check participants' understanding about employee training & records through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	15 Minutes
Step-3	GMP & SCP	Check their understanding and understanding about common GMP & SCP features through question and answer. Use examples to illustrate the importance of GMP, such as maintaining proper temperature control, good hygiene practices, and preventing cross-contamination.	15 Minutes

		Explain the principles of SCP, such as regular cleaning and sanitation, and provide examples of how these procedures can help prevent foodborne illness. Now discuss the topic consistently through the PPT slides and attached hand-out.	
Step-4	HACCP versus SCP	Check participants understanding about the common things of HACCP vs SCP through question and answer. Discuss the differences between HACCP and SCP, and explain how they complement each other to ensure seafood safety. Now give the participants a short overview about the relationship using PPT slides and attached hand-out.	20 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. Summarize the key points of the session and thanking everyone.	6 Minutes

Pre-requisite Programs for HACCP Implementation

HACCP is not a stand-alone program, but part of a larger system of control procedures to ensure food safety. For HACCP to function effectively, it needs to be accompanied by what are called “Pre-requisite programs”.

Pre-requisite programs provide the basic environmental and operating conditions that are necessary for the production of safe and wholesome food. Some of these programs are required by regulations such as Good Manufacturing Practices (GMP) and Sanitation Control Procedures (SCP) and others are recommended.

There are a number of requirements that may also be considered Pre-requisite programs about which processors must be aware. While this course cannot discuss all Pre-requisite programs in detail, it is important for seafood processors to know that depending on the product being processed or the nature of your operation, there will be additional compliance requirements that apply to the seafood’s being processed.

Prerequisite programme: Programmes including Good Hygiene Practices, Good Aquacultural Practices and Good Manufacturing Practices, as well as other practices and procedures such as training and traceability, that establish the basic environmental and operating conditions that set the foundation for implementation of a HACCP system.

Required Pre-requisite programs for seafood HACCP

The following are Pre-requisite programs that a processor is required to have in place in order to support the Seafood HACCP program.

- Employee training and training records
- Good Manufacturing Practice (GMP)
- Sanitation Control Procedures (SCP)

1. Employee training and training records

Employee qualifications

Employees who supervise or who manufacture, process, pack or hold food must be qualified to perform their assigned duties and are required to have the education, training and/or experience necessary to manufacture, process, pack or hold clean and safe food.

Employee training

Employees must receive training in the principles of food hygiene and food safety which must include information on the importance of employee health and personal hygiene. The appropriate scope of the training depends on the employee’s assigned duties. The training may be provided by facility personnel, a third-party source, or a combination of both. Training may be provided by any reasonable means, for example, on the job, in a classroom setting, or online. It is also anticipated that refresher training will be provided when needed.

Training documentation and record-keeping requirements

Facilities are required to keep records that document the training on the principles of food hygiene and food safety for those who supervise or perform manufacturing, processing, packing, or holding activities for food. Processors must maintain records of this training for 2 years.

Pre-requisite programs (PRPs) are essential components of a Hazard Analysis and Critical Control Points (HACCP) system and provide a foundation for its implementation. PRPs are preventive measures aimed at maintaining a sanitary and hygienic environment in a food processing facility. The following are some common PRPs that are necessary for the successful implementation of a HACCP system:

- 1. Good Manufacturing Practices (GMP): This program sets out basic sanitation and hygiene standards for food processing facilities, including the design and construction of the building and equipment, personnel practices, and cleaning and sanitation procedures.*
- 2. Pest Control: This program outlines measures for preventing and controlling pests, such as rodents and insects, in a food processing facility.*
- 3. Sanitation Standard Operating Procedures (SSOPs): This program establishes procedures for cleaning and sanitizing equipment, facilities, and surfaces in a food processing facility.*
- 4. Allergen Control: This program outlines measures for preventing cross-contamination of food allergens and for properly labeling products that contain allergens.*
- 5. Personnel Practices: This program outlines measures for ensuring that personnel have the necessary training, knowledge, and skills to follow food safety procedures and to prevent contamination of food products.*
- 6. Water Quality: This program outlines measures for ensuring that water used in food processing is safe and free of harmful contaminants.*
- 7. Supplier Approval: This program outlines a process for evaluating and approving suppliers of raw materials, ingredients, and other food-related products.*

These PRPs serve as the foundation for a HACCP system and provide a framework for ensuring that food products are processed in a safe and hygienic environment. Implementing effective PRPs is critical for the successful implementation of a HACCP system and for ensuring the safety of food products.

2. Good Manufacturing Practices (GMP)

Good Manufacturing Practices (GMP) is the basis for determining whether the facility, processing methods, practices and controls used to process food products are suitable to allow for the production of safe and wholesome food and whether the products have been processed under sanitary conditions.

GMP outline the minimum standards that a food processing facility needs to meet including (but not limited to): personnel, buildings and facilities, equipment, production and process controls, raw materials, and manufacturing operations.

3. Sanitation Control Procedures (SCP)

SCP are the necessary procedures to meet specified GMP requirements which, in the absence of control, could impact food safety. When SCP are in place, HACCP plans can more effectively focus on the hazards associated with the product or process and rather than the processing plant environment or employee practices.

By properly implementing SCP, a processor is able to control potential food safety hazards caused by unsanitary conditions associated with the plant environment and employee practices.

4. HACCP versus SCP

The SCP provides flexibility regarding how a processor will meet the monitoring, corrections and record-keeping requirements. Processors may create sanitation controls as part of an expanded HACCP plan, or can create sanitation controls as a cross-cutting system that establishes the Pre-requisite foundation for species/finished product and process-focused HACCP Plans.

Sanitation controls are not typically included in the HACCP plan. Sanitation controls address the overall processing plant environment and employee practices. If sanitation controls are established as a Pre-requisite program, HACCP controls can then focus on the control of species related and process-related hazards for a given finished product.

For example, hand washing is an overarching employee practice and not specifically limited to a given product or processing step. Likewise, routine cleaning of food contact surfaces is not specifically related to a single product or a particular processing step.

Table: Example of hazard and control

Hazard	Control	Type of Control	Control Program
Histamine	Time and temperature controls for fish	Product specific	HACCP
Pathogen survival	Time and temperature controls for smoking fish	Processing step	HACCP
Contamination with pathogens	Wash hands before touching product	Employee	Sanitation or SCP
Contamination with pathogens	Limit employee movement between raw and cooked areas	Employee	Sanitation or SCP
Contamination with pathogens	Clean and sanitize food contact surfaces	Plant environment	Sanitation or SCP
Chemical contamination	Use only food-grade grease	Plant environment	Sanitation or SCP

Session Plan

Day: 04	Session: 4.3	Duration: 60 Minutes
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Session Title: Preliminary steps: Assemble a HACCP team

Learning objectives

At the end of this session, participants will be able to-

- Understand Preliminary steps of HACCP;
- Understand the importance of assembling a Hazard Analysis and Critical Control Points (HACCP) team;
- Demonstrate knowledge of the roles and responsibilities of team members in HACCP implementation;
- Understand the benefits of involving various departments and personnel in the HACCP process;
- Demonstrate knowledge on how to select and assemble a cross-functional HACCP team;
- Understand the importance of clear communication and teamwork in HACCP implementation;
- Demonstrate knowledge on how to establish a team charter to guide the HACCP process;
- Understand the importance of continuous training and development for HACCP team members;
- Demonstrate knowledge on how to involve and engage all stakeholders in the HACCP process.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Assemble a HACCP team	Check participants' understanding about HACCP team through question and answer. Now present and discuss how the team could assemble using PPT slides and the attached hand-out.	15 Minutes
Step-3	Exercise	The instructor should facilitate exercise of forming HACCP team among the participants. Each team should prepare flip charts or PowerPoint slides about their own HACCP team.	15 Minutes
Step-3	Presentations	Each team should present their flip charts or PowerPoint slides describing their understanding about assemble a HACCP team.	20 Minutes
Step-3	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone	6 Minutes

Preliminary Steps: Assemble a HACCP Team

Before building a HACCP plan, there are preliminary steps that should be considered. There are several different preliminary steps that need to be completed before applying HACCP principles.

Preliminary step of HACCP

- Assemble a HACCP team
- HACCP Team composition
- Knowledge required for HACCP team.

These steps involve gathering information about the products and the process that you will need to conduct a hazard analysis. Preliminary steps:

- Assemble HACCP team
- Describe the product
- Intended use and consumers
- Develop a Process Flow Chart
- Develop a Process Description

The HACCP (Hazard Analysis and Critical Control Points) team is a group of individuals responsible for developing and implementing a food safety management system based on the HACCP principles. The team should be composed of individuals who have the necessary knowledge, skills, and experience in food safety and HACCP, and who are able to make informed decisions about the food safety risks and control measures.

Here are some preliminary steps to assemble a HACCP team:

- *Identify the team leader: The team leader should be an experienced and knowledgeable individual who has a strong understanding of HACCP principles and can lead the team effectively.*
- *Select team members: The team should include individuals with diverse backgrounds and expertise, such as food production, food science, quality control, microbiology, and others who have a stake in food safety.*
- *Assign roles and responsibilities: Clearly define the roles and responsibilities of each team member, such as taking charge of specific tasks or acting as a liaison with other departments.*
- *Schedule regular meetings: Schedule regular meetings to discuss the progress of the HACCP implementation and to make any necessary changes.*
- *Provide training: Provide team members with training on HACCP principles, food safety regulations, and any relevant technical knowledge or skills.*

It is important to note that the HACCP team should be cross-functional, representing all departments and levels of the organization, and should have the authority and support to implement the HACCP program.

Assemble a HACCP team

Assembling a HACCP team is an important step in building a HACCP plan. The team should consist of individuals with different specialties and experience with the process. The HACCP team should include members who are directly involved with the plant's daily operations. The team may include personnel from maintenance, production, sanitation, quality control and laboratory. They develop the HACCP plan, write SCP, and verify and implement the HACCP system. The team members should be knowledgeable about food safety hazards and HACCP principles.

In addition to writing and developing the HACCP plan, the HACCP team provides oversight of the implementation of the plan into the daily operations of the facility. This includes ensuring that applicable personnel are trained appropriately to handle their required duties.

Ideally the team should not be larger than six, although for some stages of the study it may be necessary to enlarge the team temporarily with personnel from other departments, e.g., marketing, research and development or purchasing and finance.

Team composition

When selecting the team, the coordinator should focus on:

- Those who will be involved in hazard identification
- Those who will be involved in determination of critical control points
- Those who will monitor critical control points
- Those who will verify operations at critical control points
- Those who will examine samples and perform verification procedures

Knowledge required

Selected personnel should have a basic understanding of:

- Technology and equipment used on the processing lines
- Practical aspects of the food operations
- The flow and technology of the process
- Applied aspects of food microbiology
- HACCP principles and techniques

Scope

One of the first tasks of the HACCP team should be to identify the scope of the HACCP plan. The team should:

- Limit the study to a specific product and process
- Define the type(s) of hazards to be included (e.g., biological, chemical, physical)
- Define the part of the food chain to be studied

Coordinator

The team must include a coordinator (chairperson) whose role is to:

- Ensure that the composition of the team meets the needs of the study
- Suggest changes to the team if necessary
- Coordinate the team's work
- Ensure that the agreed established plan is followed
- Share the work and responsibilities
- Ensure that a systematic approach is used
- Ensure that the scope of the study is met
- Chair meetings so that team members can freely express their ideas
- Represent the team before management
- Provide management with an estimate of the time, money and labor required for the study

Training requirements

It is essential that the team members be trained on the Codex General Principles of Food Hygiene and the guidelines for the application of the HACCP system to ensure that the team will work together with a common focus and use the same approach and terminology.

Approach

The instructor should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

Exercise

The instructor should have the trainees consider and identify the appropriate composition and areas of knowledge of an HACCP team and list these on flip charts or PowerPoint presentations.

Session Plan

Day: 04	Session: 4.4	Duration: 60 Minutes
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Session Title: Preliminary steps: Describe the product, intended use and consumers

Learning objectives

At the end of this session, participants will be able to:

- Understand the importance of describing the product in HACCP implementation;
- Demonstrate knowledge of how to accurately identify the product, its intended use and target consumers;
- Understand the importance of considering product characteristics, such as composition, formulation, packaging, and labelling;
- Demonstrate knowledge of how to identify the target consumer and their specific needs and expectations;
- Understand the importance of considering product distribution, storage, and handling conditions;
- Demonstrate knowledge of how to determine the end-use of the product, such as cooking, processing, or consumption;
- Understand the importance of considering the life cycle of the product, from raw materials to final consumption;
- Demonstrate knowledge of how to identify and assess potential hazards associated with the product and its intended use.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system, handout, training notes etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Describe the product, intended use and consumers	Check participants understanding about product description, intended use & consumers through question and answer. Now present and discuss the topics consistently using PPT slides and the attached hand-out.	15 Minutes
Step-3	Exercise	Check participants' understanding about GMP through question and answer. Now present and discuss the course format& expectations from participants consistently using PPT slides and the attached hand-out.	15 Minutes
Step-4	Presentations	Check their understanding and understanding about why GMP important in seafood processing through question and answer. Now discuss the topic consistently through the PPT slides and attached hand-out.	20 Minutes
Step-3	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Preliminary Steps: Describe the Product, Intended Use and Consumers

The HACCP team should describe the product(s), the type of packaging, the method of distribution, the intended customer (e.g., general public, infants, elderly) and likely use of the product (e.g., consumed without further cooking, heat-and-serve, cooked).

To complete this description as accurately as possible it is important that the team be familiar with the properties, destination and use of the product. It is important, for example, to take into consideration whether sensitive segments of the population may consume the product.

The HACCP team needs to have as complete an understanding of the product as possible. All details of the product's composition and processing should be known and understood. This information will be essential particularly for microbiological hazards because the product's composition needs to be assessed in relation to the ability of different pathogens to grow.

Product Description should include:

- *Type of seafood product (species and finished product form)*
- *Where product is purchased*
- *How product is received, stored, and shipped*
- *How product is packaged*
- *Intended use*

1. Describe the product, intended use and consumers

1.1 Describe the product

- Type of seafood:
 - Species of fish or shellfish including market name (e.g., tuna) and scientific name (e.g., *Thunnus albacares*), if necessary
 - Finished product form (e.g., raw, cooked, pasteurized, smoked, etc.)

It is important to know which species are being processed in order to accurately identify potential food safety hazards. For the same reason, it is important to know the finished product form.

- Identify where product is purchased:
 - directly from the fisherman or harvest vessel;
 - directly from the aquaculture grower or farm;
 - from another processor; or
 - from a combination of these sources.

It is important to know where the product is purchased to identify the correct potential food safety hazards. For example, how a potential hazard is addressed will depend on whether the processor is a “primary processor” or a “secondary processor.” The primary processor is the processor that takes possession of a seafood product directly from the harvester or fish farm. A secondary processor is a processor who receives a seafood product from another processor.

- Identify how the fish are received:
 - fresh – under refrigeration;
 - fresh – under ice or chemical coolant;
 - frozen;
 - canned or shelf-stable;
 - more than one of these methods.
- Identify how the fish are stored after receipt:
 - fresh – under refrigeration;
 - fresh – under ice or chemical coolant;
 - frozen;
 - dry storage.

- Identify how the finished product will be shipped:
 - fresh – under refrigeration;
 - fresh – under ice or chemical coolant;
 - frozen;
 - ambient conditions;
 - more than one of these methods.
- Identify how the finished product will be packaged:
 - air-permeable packaging (e.g., foam tray overwrapped with fresh meat film);
 - reduced-oxygen packaging (e.g., vacuum packaging, modified-atmosphere packaging, controlled-atmosphere packaging; hermetically-sealed packages; or packed in oil).

It is important to know how products are received, stored, packaged, and shipped to identify any potential food safety hazards during the hazard analysis.

1.2 Intended use

- Identify how the products are intended to be used:
 - to be cooked by the consumer;
 - ready-to-eat (RTE) raw;
 - RTE – cooked
 - RTE – partially cooked;
 - RTE – heat and serve;
 - RTE – reheat.

It is important to know how the product will be consumed to identify any potential food safety hazards.

1.3 Intended consumer

- Identify the intended consumer:

Intended consumer information needs to identify whether the end user will be the general public or a specific at-risk consumer group such as infants and the elderly.

- General Public
- At-risk Population

Knowing who the end user will be may be relevant when identifying potential hazards during the hazard analysis.

1.4 Product description form

A Product Description form (Form 1) could be used to record all of this information. A blank form can be found in the following page.

2. Exercise - Describe the product, intended use and consumers

2.1 Approach

The instructor should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2.2 Exercise

The instructor should have each of the "HACCP teams" formed select a product and describe all of the appropriate characteristics of the product/the ingredients and the packaging materials using Form 1. Each team should then present its findings using flip charts or PowerPoint slides.

Form 1: Product Description Form

Intended Consumer	At-risk population						
	General public						
Intended use	Cooked, RTE						
	Raw, RTE						
	Raw, to be cooked						
How product is packaged	Other than Reduced-oxygen packaged						
	Reduced-oxygen/vacuum packaged						
	Air Packed						
How Product is Shipped	Live						
	Frozen						
	Iced						
How Product is Stored	Live						
	Frozen						
	Iced						
How Product is Received	Live						
	Raw Iced						
Where Product is Purchased (Source)	Supplier/Dealer						
	Fish Farm						
	Fisherman						
Acceptable Market Name & Species							

Session Plan

Day: 04	Session: 4.5	Duration: 60 Minutes
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Session Title: Developing process flow chart and process description

Learning objectives

At the end of this session, participants will be able to-

- Understand the importance of visualizing and documenting the production process as a key step in establishing a Hazard Analysis and Critical Control Points (HACCP) program.
- Break down the production processes into individual steps and represent each step in a clear and concise manner.
- Identify the critical control points in the production process and describe the measures used to control the associated hazards.
- Gain a comprehensive understanding of the production process, including inputs, outputs, and any equipment used.
- Provide a clear and detailed roadmap for the HACCP team to follow when monitoring and verifying the critical control points.
- Ensure accuracy and consistency in the HACCP program by providing a reference point for the HACCP team to follow.
- Provide a basis for continuous improvement by allowing the HACCP team to review and update the process flow chart and process description as necessary.
- Develop a process flow chart
- Explain Process description.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Develop a process flow chart	Check participants' understanding about process flow chart through question and answer. Now describe how to develop process flow chart using PPT slides and the attached hand-out.	20 Minutes
Step-3	Process description	Check participants' understanding about process description through question and answer. Now present and discuss how to develop process description using PPT slides and the attached hand-out.	30 Minutes
Step-4	Summary and Evaluation	Check their understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Preliminary Steps: Developing Process Flow Chart and Process Description

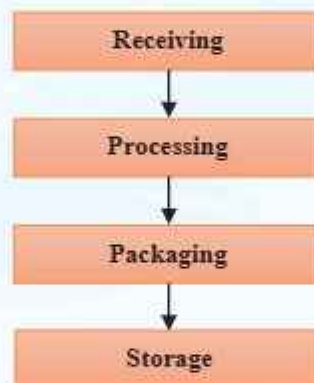
1. Develop an accurate process flow chart

A flow chart provides an important visual tool that the HACCP team can use to identify and describe the process. When developing a process flowchart, it is important to include all the process steps within the facility's control from receiving through final product storage, including reworked product if applicable.

- *Process flow chart development*
- *Description of process flow chart*
- *On-site confirmation of flow diagram*

Since the accuracy of the process flow is critical to conduct a hazard analysis, the steps outlined in the chart must be verified at the plant. If a step is missed, a significant food safety hazard may be missed. Include every handling, processing and holding step for primary product as well as ingredients and packaging. The HACCP team should walk through the facility and make any changes required in the flow chart. The walk-through allows each team member to gain an overall picture of how the product is made. It may be helpful to invite additional plant personnel to review the diagram during the walk-through.

Fig: Basic process flow chart



2. Develop a process description

A written process description can be a useful tool to explain what happens at each of the process steps needed to produce a product covered by a particular HACCP plan. This description can be used as a working reference for the development of the HACCP plan and to facilitate communication with company personnel and regulators. It is also important to know what occurs at each process step. For example, it is important to know information about process steps such as the maximum length of time that the product could be exposed to unrefrigerated temperatures, the maximum room air temperature, or the maximum internal product temperature. This information is necessary to conduct an accurate hazard analysis.

3. On-site confirmation of flow diagram and plant schematic

Once the process flow diagram and plant schematic have been drafted, they must be confirmed by an on-site inspection for accuracy and completeness. This will ensure that all the major process operations have been identified. It will also confirm the assumptions made with respect to the movement of product and employees on the premises.

The draft flow diagram should be compared with the operation it represents on site. The process should be reviewed at various times throughout the hours of operation to verify that the flow diagram is valid throughout all operational periods. All members of the HACCP team should be involved in the flow diagram confirmation. Adjustments should be made to the flow diagram, as necessary based on the actual operations observed.

Here is an example of a high-level process flow chart for a HACCP (Hazard Analysis and Critical Control Points) team:

(1) Receiving:

- Inspect incoming raw materials for signs of contamination or spoilage.
- Verify supplier's certificate of analysis or equivalent documentation.
- Document the results of inspection and verification.

(2) Storage:

- Store raw materials in designated areas to prevent cross-contamination.
- Monitor storage temperatures to ensure proper conditions are maintained.
- Rotate raw materials to prevent overstaying beyond their shelf life.

(3) Preparation:

- Clean and sanitize preparation area and equipment.
- Prepare raw materials according to established procedures.
- Monitor preparation temperatures and pH levels to ensure they are within established parameters.

(4) Cooking/Processing:

- Cook or process food items according to established procedures.
- Monitor cooking/processing temperatures and time to ensure product safety.

(5) Cooling:

- Rapidly cool cooked/processed food items to prevent growth of harmful bacteria.
- Monitor cooling temperatures to ensure proper conditions are maintained.

(6) Holding/Storage:

- Store cooked/processed food items in designated areas to prevent cross-contamination.
- Monitor holding/storage temperatures to ensure proper conditions are maintained.

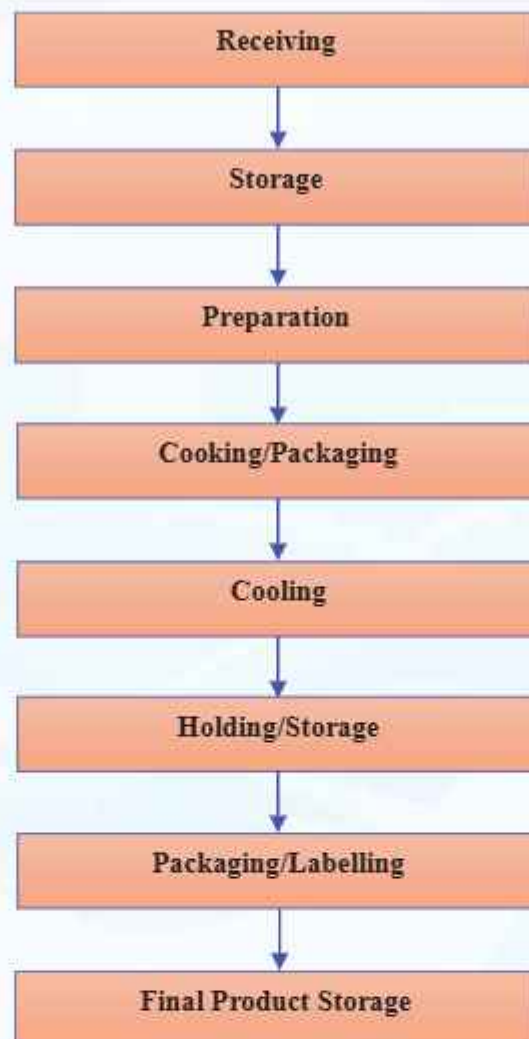
(7) Packaging/Labelling:

- Pack food items in appropriate packaging materials.
- Label food items with necessary information (e.g. date of production, shelf life, ingredients, etc.).

(8) Final Product Storage:

- Store final products in designated areas to prevent cross-contamination.
- Monitor storage temperatures to ensure proper conditions are maintained.
- Rotate final products to prevent overstaying beyond their shelf life.

Fig: Advanced Process Flow chart



Note: This flow chart is just an example and should be adapted to fit the specific needs and processes of the facility. It is important for the HACCP team to conduct a hazard analysis and establish critical control points to ensure food safety at each step in the process.

Session Plan

Day: 04	Session: 4.6	Duration: 60 Minutes
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Session Title: Exercise - Develop a process flow chart and process description

Learning objectives

At the end of this session, participants will be able to-

- Develop a process flow chart.
- Explain process description

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Exercise	Each of the "HACCP teams" formed select a product and develop process flow charts and process description.	20 Minutes
Step-3	Presentations	Each team should present its process flow charts and process description using flip charts or PowerPoint slides.	30 Minutes
Step-4	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Exercise - Develop a Process Flow Chart and Process Description

1. Approach

The facilitator should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2. Exercise

The facilitator should have each of the "HACCP teams" select a specific product with which the participants are familiar and prepare a theoretical flow diagram for the product. Each team should select a different product and where possible the different products should represent different sectors of the food industry in the country or region of training.

The facilitator can select product like:

- (1) Black tiger Head Less Shell on Block Frozen
- (2) IQF Black tiger Head Less Shell on easy peel

Steps are to be included in the flow chart:

- 1. Break down the process into individual steps: Divide the process into manageable steps and assign a symbol or block to represent each step.*
- 2. Determine the flow of the product: Using arrows indicate the flow of the product from one step to the next.*
- 3. Include equipment, inputs, and outputs: Identify and include all the equipment, inputs, and outputs for each step in the flow chart.*
- 4. Label the flow chart: Label each step with a clear and concise description of the process being performed.*
- 5. Identify critical control points (CCPs): Highlight the CCPs within the flow chart and provide a brief description of the hazard being controlled and the measures used to control the hazard.*
- 6. Review and validate the flow chart: Have the HACCP team review the flow chart to ensure accuracy and completeness. Make any necessary revisions and validate the flow chart.*
- 7. Update the flow chart as necessary: The process flow chart should be reviewed and updated regularly to ensure it remains accurate and relevant.*

It is important to create a clear and concise process flow chart that accurately reflects the production process and helps to identify the critical control points. The flow chart should be easily understood by all members of the HACCP team and should serve as a valuable reference tool for monitoring and verifying the CCPs.

Session Plan

Day: 05	Session: 5.1	Duration: 30 Minutes
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Session Title: Review and feedback of previous day's learning

Learning objectives

At the end of this session, participants will be able to:

- Review the previous day's learning and provide feedback;
- Recall their previous discussions and revise and enhance the learnings from the sessions.
- Correct mistakes and reach a consensus by reviewing the previous day's learning.

Methodology: discussion and Q&A

Materials: Board, markers, sound system

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	▪ Warm-up activities. ▪ Connecting to the current session.	4 Minutes
Step-2	Content	▪ Review of previous day's activities by a trainee. ▪ All participants feedback on topics discussed on the previous day.	20 Minutes
Step-3	Summary	▪ Connecting to the next session. ▪ Feedback on participant's discussion with thanking everyone.	6 Minutes

Session Plan

Day: 05	Session: 5.2	Duration: 60 Minutes
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Session Title: Hazard Analysis

Learning objectives

At the end of this session, participants will be able to-

- Understand HACCP principles and its application in hazard analysis;
- Demonstrate clear knowledge of the facility's processes, including hazard identification at each step;
- Able to identify physical, chemical, and biological hazards and assess their likelihood and severity;
- Develop skills to prioritize control measures based on risk level and develop appropriate measures;
- Monitor and verification abilities to maintain control measure effectiveness;
- Proper documentation skills for hazard analysis process and its activities.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system and handouts

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Identify potential food safety hazards	Check participants' understanding about list of process steps in a hazard analysis through question and answer. Now present and discuss the step-by-step hazard analysis process using PPT slides and the attached hand-out.	20 Minutes
Step-3	Species & process related hazard	Check participants' understanding about list of Species & process related hazard through question and answer.	15 Minutes
Step-4	Hazard evaluation, justification & control measures	Check participants' understanding about Hazard evaluation, control measure for various hazards & justification using PPT slides and the attached hand-out.	15 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

HACCP Principle 1: Hazard Analysis

The first step in developing a HACCP plan is to identify all of the significant food safety hazards that are associated with the seafood product(s) and process(es), as well as the control measures. This procedure is called hazard analysis, the first principle of HACCP.

Not all potential hazards are significant. A significant hazard is one that is reasonably likely to occur and presents a health risk to the consumer if it is not controlled. Control measures must be identified for all significant hazards.

Hazard: *A hazard is any biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of control(s)*

1. How to conduct a hazard analysis

The hazard analysis is conducted to identify:

- All potential food safety hazards,
- Which of these hazards are significant, and
- Measures to control the significant hazards.

There is a sequence of steps that need to be completed when conducting a hazard analysis. Each step is an important part of the procedure. Five steps in a hazard analysis are -

- List process steps
- Identify potential food safety hazards
- Determine if the hazard is significant
- Justify the decision
- Identify control measure(s)

These steps will be discussed individually using a worksheet to document the results or conclusions.

Hazard Analysis Worksheet

A hazard analysis worksheet should be used to ensure that all steps in the hazard analysis process are completed. A written hazard analysis is important because it is the best way to determine if there are significant food safety hazards that need to be controlled.

Step 1: List process steps

Process flow chart need to be developed as part of the preliminary steps. List each of these process steps in the hazard analysis. A written hazard analysis is important because it is the best way to determine if there are significant food safety hazards those are needed to be controlled. For exercise – enter each of the processing steps from the process flow chart in Column 1 of the hazard analysis worksheet. Each step will have its own block on the worksheet, and should be listed in the same order as on the process flow chart.

Step 2: Identify potential food safety hazards

List all of the potential food safety hazards related to each type of fish or fishery product (Species related hazard) and the process. To begin, every potential seafood safety hazard must be identified. Use knowledge gathered in this course and take support from international guidelines to identify potential seafood safety hazards. Then list all of the potential hazards at each processing step.

For exercise – every identified seafood hazard should be listed in column 2 for each of the listed processing steps in column 1.

Form 2: Hazard Analysis Worksheet

Firm Name:			Product Description:		
Firm Address:			Method of Storage & Distribution:		
			Intended use & consumer:		
Processing Steps	List all potential food safety hazards that could be associated with this product and process*	Is the potential food safety hazard significant (introduced, enhanced or eliminated) at this step? (Yes/No)	Justify the decision that you made in column 3	What control measure(s) can be applied to prevent, eliminate or reduce this significant hazard?	Is this step a Critical Control Point? (Yes/No)
1	2	3	4	5	6

Species-Related Hazards

The scientific or Latin name for each type of fish and fishery products need to be identified and listed. Then list the potential hazards that are known to be associated with fish and fishery products. These hazards are referred to as “species-related hazards.” If the potential hazard is reasonably likely to occur in a certain species of fish and fishery products this hazard should be listed as a “potential” hazard.

For exercise - use Form 2 to list identifying potential species-related hazards.

Form 3: Potential species-related hazards table

Market Names	Latin Names	Parasite hazards	Natural toxin hazards	Scombrototoxin (Histamine) hazards	Environmental chemical hazards	Aquaculture Drug Hazards

Process-Related Hazards

The potential process-related food safety hazards that might occur in seafood products or processing operations need to be identified and listed. When selecting a finished food and package type it is important to review all of the entries for the best fit for the product being considered. You may need to include potential hazards from more than one 'category' if your product fits more than one description. For example, a hot smoked fish could require controls for a smoked and cooked seafood.

For exercise - use Form 2 to list identifying potential species-related hazards.

Form 4: Potential process-related hazards table

Finished product food	Package type	Hazards									
		Pathogenic bacteria – temperature abuse	<i>C. botulinum</i> toxin	<i>S. aureus</i> toxin - Drying	<i>S. aureus</i> toxin - Batter	Pathogenic bacteria survival: Through cooking or pasteurization	Pathogenic bacteria survival: Through process designed to retain raw product characteristics	Pathogenic bacteria contamination after pasteurization and specialized cooking process	Allergens and food intolerance substances	Metal inclusion	Glass inclusion

Sanitation-Related Hazards

The HACCP team may identify hazards caused by conditions or activities in the plant such as employee, practices cross-contamination, or food allergen cross-contact. Rather than controlling these sanitation-related hazards in a HACCP plan, it is recommended that the sources of contamination be controlled in a separate, but equally important, Sanitation Control Procedures (SCP). A Sanitation Control Procedures applies to all parts of the operation and is designed to prevent the many different sources of contamination from the plant environment.

Step 3 & 4: Hazard evaluation and justification

After the hazard identification is completed, the HACCP team must evaluate the hazards. Each potential hazard will be evaluated to determine if it is **significant** at each process step. The hazard evaluation, or risk assessment, is designed to determine which hazards are reasonably likely to occur and need to be controlled.

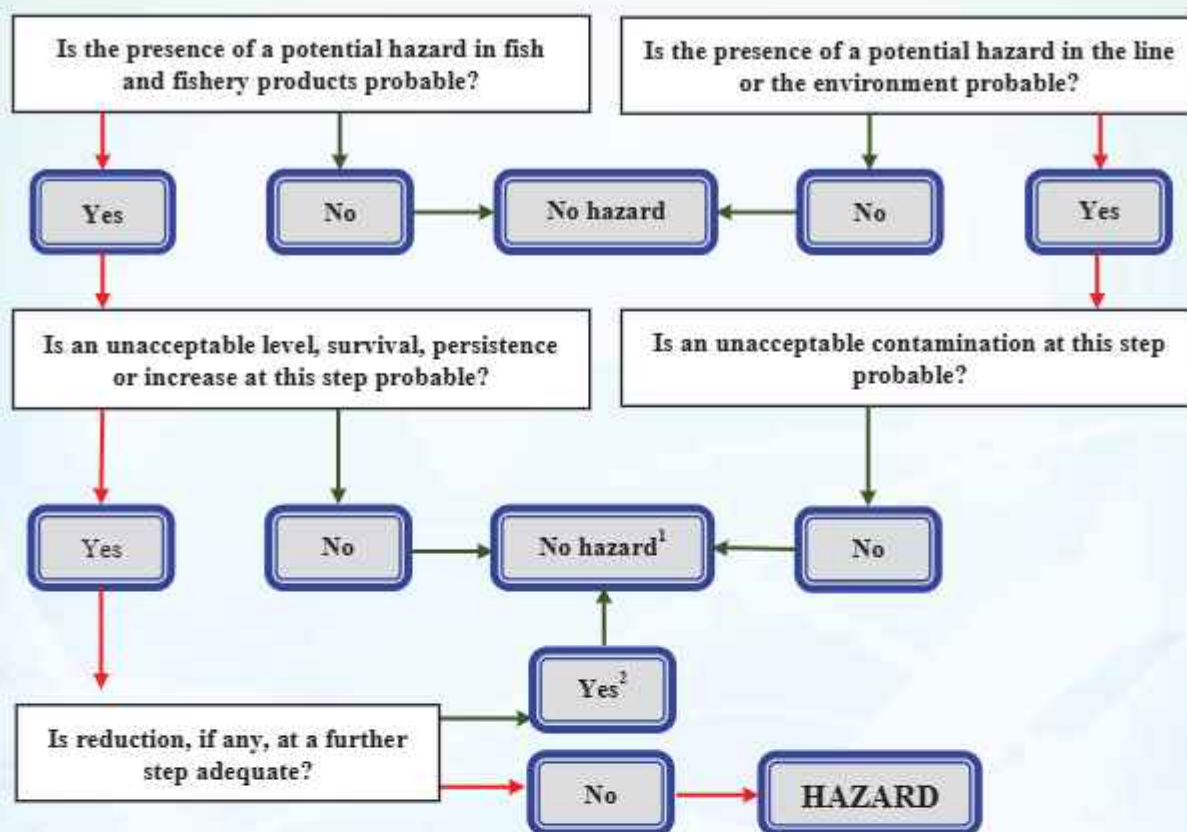
HACCP focuses solely on food safety hazards that are **reasonably likely to occur and are likely to result in an unacceptable health risk to consumers if they are not controlled**. The hazard evaluation is designed to determine which hazards are relevant. To determine if a hazard is significant, consider two questions –

- Is the hazard reasonably likely to occur in the finished product in the absence of control?
- Is the hazard likely to cause consumer illness?

Some processors will have the expertise necessary to complete the hazard evaluation, while others may need to seek outside assistance to complete this step. The HACCP team should use various international guidelines, scientific journal, experience, and other tools (e.g., test results, studies, Alerts, recalls, etc.) that are available to help them determine whether or not a hazard is significant. There may be differences of opinion, even among experts, regarding whether or not a hazard is significant in a given situation.

For exercise – use worksheet Column 3 for hazard evaluation decision and Column 4 for justification

Fig: Hazard determination– questions to be answered for each potential hazard at each step



1. Not a hazard to be controlled at this step
2. Thus, reduction step becomes CCP

Step 5: Identifying Control Measures

The final step in the hazard analysis process is to determine the appropriate control measures where intend to use to prevent, eliminate or reduce to an acceptable level each of the significant hazards identified in hazard evaluation. This is important because if the hazard is truly significant there must be an appropriate control measure or product would not be safe.

Control measures are actions and activities that can be used to prevent, eliminate, or reduce a food safety hazard to an acceptable level. In practice, control measures could include a wide array of activities that will be effective for a specific hazard.

Different control measures for pathogenic bacteria, viruses and parasites may be used to control a hazard.

For exercise – use worksheet Column 5 for identified control measures.

Control measures for pathogenic bacteria could include:

- 1) Good Agricultural Practices (GAPs) to minimize contamination at the source.
- 2) Use of potable water in all phases of food production, processing, and handling.
- 3) Time/temperature controls: proper control of refrigeration and storage time to minimize or prevent bacterial pathogen growth.
- 4) Heating and cooking processes to eliminate (kill) bacterial pathogens.
- 5) Freezing to prevent bacterial pathogen growth.

- 6) Fermentation and/or pH controls to ensure that foods are acidic enough to prevent bacterial pathogen growth.
- 7) Addition of salt or other preservatives to prevent bacterial pathogen growth.
- 8) Drying to ensure that enough water has been removed from the food to prevent bacterial pathogen growth.
- 9) Source control or buying raw material from acceptable sources to reduce the risk of bacterial pathogens to an acceptable level.
- 10) Use of sanitizers and disinfectants to reduce the presence of bacteria on food contact surfaces.
- 11) Employee health and hygiene training to minimize the risk of contamination from food handlers.
- 12) Proper labeling and traceability to enable rapid recall in case of contamination.

Control measures for pathogenic viruses could include:

- 1) Cooking methods designed to eliminate (destroy) viruses.
- 2) Source control or buying raw material from acceptable sources to reduce the risk of viruses to an acceptable level.

Control measures for parasites could include:

- 1) Cooking at the proper temperature for the proper amount of time to eliminate (kill) parasites.
- 2) Freezing at the proper temperature for the proper amount of time to eliminate (kill) parasites.

Control measures for chemical and physical hazards:

Different control measures for chemical and physical hazards may be used to control a hazard. Control measures for chemical hazards, such as natural toxins, pesticides, drug residues, unapproved food and color additives, and histamine, could include:

- 1) Source controls to reduce the risk that fishery products were harvested from areas where chemical hazards like environmental pollutants or natural toxins like ciguatera are present at levels that could cause consumer illness or harm.
- 2) Time/temperature controls for chemical hazards such as histamine that prevent the hazard from forming in certain fish species.
- 3) Production controls to ensure that the proper amount of any food additives is used.
- 4) Labeling controls to ensure that consumers are aware that any known allergens are present in the product.

Control measures for physical hazards, such as metal and glass, could include:

- 1) Source controls that reduce the risk that products supplied by vendors will contain any physical hazards like metal or glass.
- 2) Production controls such as visual inspections of the equipment or container, using magnets, metal detectors, sifter screens or other devices to prevent any finished products that contain metal or other physical hazards from entering the marketplace.

Session Plan

Day: 05	Session: 5.3	Duration: 60 Minutes
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Session Title: Exercise - Hazard Analysis

Learning objectives

At the end of this session, participants will be able to-

- Prepare product list with description;
- Documentation on method of storage, distribution & intended use for consumer;
- Prepare process flow chart;
- Analyze step by step Hazard Analysis according to flow chart.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system handout, training notes etc.

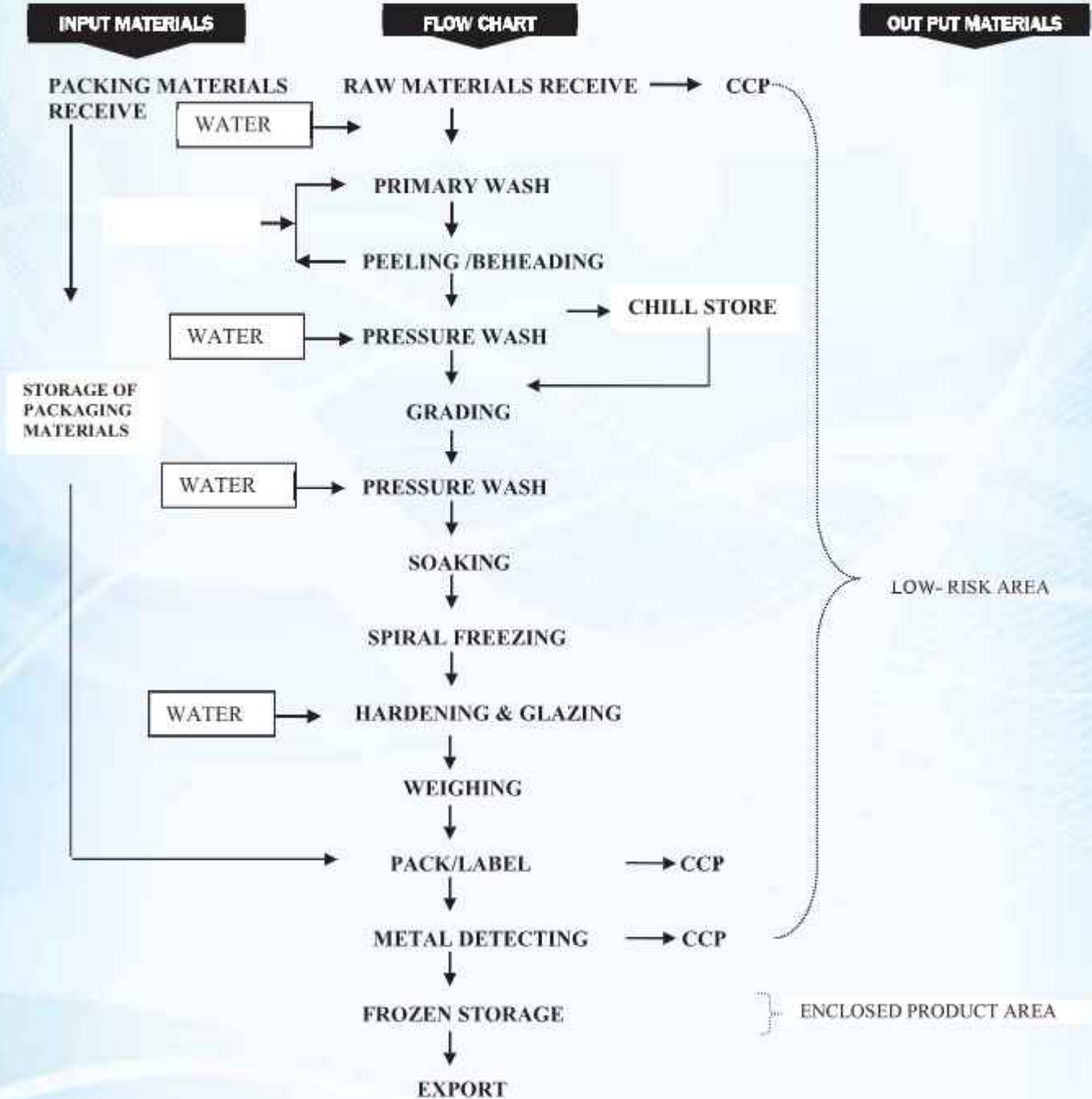
Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Product Description, method of storage & distribution & intended use	Each of the "HACCP teams" should be prepared product list with description, method of storage, distribution & intended use for consumer to prepare flip charts or PowerPoint slides of their findings	10 Minutes
Step-3	Product process flow chart, Hazard evaluation, justification & control measures	Each of the "HACCP teams" formed the process flow chart step by step through brainstorming & potential biological, chemical and physical hazard analysis. Then hazard evaluation, justification & control measures prepare flip charts or PowerPoint slides of their findings.	25 Minutes
Step-4	Presentations	Each team should present its findings using flip charts or PowerPoint slides.	15 Minutes
Step-5	Summary	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

PROCESS FLOW CHART

TYPE OF PRODUCT:

RAW IQF HLSO/HLSO Ez-PEEL/PTO/PUD/PND /SKEWER SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.



HAZARD ANALYSIS WORKSHEET

TYPE OF PRODUCT: 3.D) RAW IQF HILSO/HLSO Ez-PEEL/PTO/PUD/PND SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution : To be stored and distributed at temperature below -18°C until use

Intended Use & Consumer-Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products)

(1)	(2)	(3)				(4)	(5)	(6)		
		Significance of Hazard						Q 1	Q 2	Q 3
Ingredient/Processing Step	Identify Potential Hazards Introduced, Control or Enhanced at this Step (1)	Likelihood on scale of 1-3 1. Low Frequency 2. May Occur 3. Easily Occur	Severity on scale of 1-3 1. Not harmful 2. Medium 3. Severe	Risk R = L x S ≤3 = Low 4 - 6 = Medium 6 - 9 = High	Justification of Hazard For Column 3	What Preventive Measures Can Be Applied To Prevent The Significance Of Hazard	Q 1	Q 2	Q 3	
1. Packing Materials Receive	Biological : Pathogen from incoming packaging materials	1	2	2 Low	Not likely to contain pathogens because they are supplied by approved supplier	Controlled by SOP # 1.12	N		No	
	Chemical Chemical contamination of packages	1	2	2 Low	Not likely to contain chemicals because they are supplied by approved supplier	Controlled by SOP # 1.12	N		No	
	Physical None				NA	Controlled by SOP # 1.12	N		No	
2. Storage of Packaging Materials	Biological : Cross contamination	1	2	2 Low	Unhygienic handling					
	Chemical None				NA					
	Physical None				NA					
3. Raw Materials Receive	Biological : Pathogen from incoming raw materials (<i>Salmonella</i> , <i>V. cholerae</i>)	3	3	9 High	Pathogens likely to contaminate shrimp during farming and post harvest processes	Controlled by SOP # 1.1 Raw materials accompany suppliers certificate stating that shrimp are obtain from approved farms following GAP and free from pathogen contamination	Y	Y	YES	
	Chemical 1.a) Aquaculture drug (Antibiotics residues) (CAP, Nitrofurans Tetracycline) b) Chemicals : (Dyes Like Cristal Violet, Methylene Green)	3	3	9 High	Likely chances of contamination or use of banned drugs in aquaculture	Controlled by SOP # 1.1 Raw materials accompany suppliers certificate stating that shrimp are obtain from approved farms following GAP and free from chemicals contamination	Y	Y	YES	
	2. Environmental chemicals (Pesticide)	1	2	2 Low	No theoretical evidence		N		No	
	3. Sulfites	1	2	2 Low	May occasionally usage by the suppliers		N		No	
	4. Allergens	2	3	6 High	Shrimps is allergic to some people causing serious sickness	Controlled by SOP # 1.12 Proper labeling (to be controlled at labeling step)	Y	N	No	
	Physical 1. Metal Inclusion 2. Filth	2	3	6 High	Inclusion of metal and filth is likely. If so it may harm the consumer health	Controlled by SOP # 1.1 All finished product pass through metal detector (will be controlled at Metal Detecting step 17)	Y	N	No	

HAZARD ANALYSIS WORKSHEET

TYPE OF PRODUCT (3.D) RAW IQF HL/SO/IL/SO Ez-PEEL/PTO/PUD/PND SW/BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution :To be stored and distributed at temperature below -18°C until use.

Intended Use & Consumer:Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products).

(1) Ingredient/Processing Step	(2) Identify Potential Hazards Introduced, Control or Behaviour at this Step (1)	(3) Significance of Hazard			(4) Justification of Hazard For Column 3	(5) What Preventive Measures Can Be Applied To Prevent The Significance Of Hazard	(6)		
		Likelihood on scale of 1-3 1. Low Frequency 2. May Occur 3. Daily Occur	Severity on scale of 1-3 1. Not harmful 2. Medium 3. Severe	Risk R = $\frac{L \times S}{100}$ ≤3 = Low 4-6 = Medium 6-9 = High			Q 1	Q 2	Q 3 Is the Step a CCP (Y/N%)
4.Primary Wash	Biological : Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse	Controlled by SOP# 1.3 & SSOP #1.1	N		No
	Chemical None				N/A				
	Physical None				N/A				
5. Re-Heating & Peeling	Biological : a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature and time abuse 2. Unhygienic handling	Controlled by SOP# 1.2	N		No
	Chemical None				N/A				
	Physical None				N/A				
6.Re-Work	Biological : a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature and time abuse 2. Unhygienic handling	Controlled by SOP# 1.2	N		No
	Chemical None				N/A				
	Physical None				N/A				
7.Pressure Wash	Biological : Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse	Controlled by SOP# 1.3 & SSOP #1.1	N		No
	Chemical None				N/A				
	Physical None				N/A				

8. Chill Room	Biological: Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse	Controlled by SOP # 14	N	No
	Chemical None				N/A			
	Physical None				N/A			
9. Cooling	Biological: a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature and time abuse 2. Hygienic handling	Controlled by SOP # 14	N	No
	Chemical None				N/A			
	Physical None				N/A			
10. Pressure Wash	Biological: Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse	Controlled by SOP # 13 & SSOP# 1.1	N	No
	Chemical None				N/A			
	Physical None				N/A			

HAZARD ANALYSIS WORKSHEET

TYPE OF PRODUCT: 3.D) RAW IQF HL.SO/HL.SO Ez-PEEL/PTO/PUD/PND SW BT/ BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution :To be stored and distributed at temperature below -18°C until use

Intended Use & Consumer:Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products

(1) Ingredient/Processing Step	(2) Identify Potential Hazards Introduced, Control or Eliminated at this Step (1)	(3) Significance of Hazard			(4) Justification of Hazard For Column 3	(5) What Preventive Measures Can Be Applied To Prevent The Significance Of Hazard	Q1	Q2	Q3	(6) Is the Step a CCP (Yes/No)
		Likelihood on scale of 1-3 1. Low Frequency 2. May Occur 3. Rarely Occur	Severity on scale of 1-3 1. Not harmful 2. Medium 3. Severe	Risk R = $\frac{L \times S}{X}$ 3 = Low 4 - 6 = Medium 6 - 9 = High						
11. Soaking	Biological : Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse unlikely	Controlled by GMP	N			No
	Chemical Sodium Tri poly Phosphate or None Phosphate	2	2	4 High	A level of ingredient is likely due to time abuse which might create a allergic sickness.	Controlled by GMP Strictly maintain the concentration of chemical and duration of dipping.	Y	N		No
	Physical None				N/A					
12. Spinal Freezing	Biological : Pathogenic bacterial growth and survival	1	2	2 Low	Temperature and time abuse	Controlled by SOP# 1.7	N			No
	Chemical None				N/A					
	Physical None				N/A					
13. Hardening & Glazing	Biological : a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature and time abuse 2. Unhygienic handling	Controlled by SOP# 1.7	N			No
	Chemical None				N/A					
	Physical None				N/A					
14. Weighing	Biological : Pathogenic bacterial growth	1	2	2 Low	Temperature and time abuse	Controlled by GMP	N			No
	Chemical None				N/A					
	Physical None				N/A					

15. Pack/Label	Biological : Cross contamination	1	2	2 Low	Unhygienic handling	Controlled by SOP# 1.12	N		No
	Chemical Food Allergen	2	3	6 High	Shrimp may be a allergic to some people causing serious sickness	Controlled by SOP# 1.12 Proper labeling indicating that shrimp is an allergen	Y	Y	YES
	Physical None				N/A				
16. Metal Detecting	Biological : Cross contamination	1	2	2 Low	Unhygienic handling	Controlled by SOP# 1.8	N		No
	Chemical None				N/A				
	Physical Metal inclusion	2	3	6 High	Metal inclusion is likely during processing causing serious injuries.	Controlled by SOP# 1.8 All products pass through operating metal detector.	Y	Y	YES

6/12

HAZARD ANALYSIS WORKSHEET

TYPE OF PRODUCT: 3.D) RAW IQF HL SO/HL SO EX-PEEL /PTO/PUD/PND SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution: To be stored and distributed at temperature below -18°C until use
Intended Use & Consumer: Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products)

(1) Ingredient/Processing Step	(2) Identify Potential Hazards Introduced, Control or Enhanced at this Step (1)	(3) Significance of Hazard			(4) Justification of Hazard For Column 3	(5) What Preventive Measures Can Be Applied To Prevent The Significance Of Hazard	(6)			Is the CCP? (Yes/No)
		Likelihood on scale of 1-3 1. Low Frequency 2. May Occur 3. Easily Occur	Severity on scale of 1-3 1. Not harmful 2. Medium 3. Severe	Risk R = LXS ≤3 = Low 4 - 6 = Medium 6 - 9 = High			Q 1	Q 2	Q 3	
17. Frozen Store	Biological : a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature abuse 2. Unhygienic handling	Controlled by SOP# 1.9	N			No
	Chemical None				N/A					
	Physical None				N/A					
18. Export	Biological : a) Pathogenic bacterial growth and survival b) Cross contamination	1	2	2 Low	1. Temperature and time abuse 2. Unhygienic handling	Controlled by SOP# 1.10	N			No
	Chemical None				N/A					
	Physical None				N/A					

Signature: _____ Date: _____

President, HACCP Team

Exercise –Hazard Analysis

1. Approach

The instructor should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2. Exercise

- The instructor should lead a brainstorming session to prepare a list of potential biological, chemical and physical hazards. Flip charts or PowerPoint slides should be prepared showing all biological, chemical and physical hazards identified.
- The instructor should have each "HACCP team" identify the potential hazards associated with all aspects of their selected products and their manufacture. The teams should then present their results on Forms 2, 3 and 4 using flip charts or PowerPoint slides.

Excercise: Model

Session Plan

Day: 05	Session: 5.4	Duration: 60 Minutes
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Session Title: Determine CCP

Learning objectives

At the end of this session, participants will be able to-

- **Determine critical control points (CCP)** in a Hazard Analysis and Critical Control Points (HACCP) system;
- **Conduct a hazard analysis:** Identify all potential biological, chemical, and physical hazards that could affect food safety during production;
- **Determine the points in the process where hazards can be controlled:** Identify the points in the food production process where the hazards can be prevented, eliminated, or reduced to acceptable levels;
- **Evaluate the severity of the hazard:** Assess the severity of the hazard and determine the likelihood that it will occur;
- **Identify the critical control point:** Based on the results of the hazard analysis, determine the critical control points where control measures must be implemented to prevent, eliminate, or reduce the hazard to an acceptable level;
- **Implement control measures:** Develop and implement control measures, such as monitoring procedures, corrective actions, and verification procedures, at the CCP to ensure that the hazard is controlled;
- Prepare a CCP decision tree.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system handout, training notes etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Determine & Placement CCP	Check participants' understanding about determine CCP & placement of multiple CCP & multiple hazard through question and answer.	10 Minutes
Step-3	Tools to identify CCP	Check participants' to identify CCP through CCP decision tree using PPT slides and the attached hand-out.	25 Minutes
Step-4	Presentations	Check their understanding about determination of CCP important in seafood processing through question and answer. Now discuss the topic consistently through the PPT slides and attached hand-out.	15 Minutes
Step-5	Summary and Evaluation	Check your understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

HACCP Principle 2: Determine CCP

For each significant hazard that was identified during the hazard analysis, there are one or more points or steps in the process where the hazard can be controlled. These points or steps are called Critical Control Points. (ccp). A CCP should be a specific point in the process flow where application of a control measure effectively prevents, eliminates or reduces the hazard to an acceptable level.

CCP: A Critical Control Point is a step at which control can be applied to prevent, eliminate a food safety hazard, or reduce it to an acceptable level.

1. Determine CCP

1.1 Critical Control Point Placement

CCP placement must be at the processing step or steps that adequately control the significant hazard. If there are no control measures that can be applied at a particular process step, that step cannot be the CCP. In some cases, control measures should be applied at a particular step, but that step may not be the best place to control the hazard. In that case, a processing step that occurs later in the process flow may be the best place to control that hazard.

For example, when producing a cooked product, the hazard of pathogen growth would first be identified at the receiving step. This hazard could be controlled at any process step where the hazard can be adequately controlled. However, the best place to control this hazard would be the cooking step, where the hazard is eliminated. The cook step would be the CCP for this hazard.

There may be different control options for a single hazard. For example, a metal hazard can be controlled at different processing steps such as:

- At receiving step, ingredients are sourced that are free of metal fragments,
- At a screening step, screens are used to remove any metal fragments,
- At a metal detection step, a detector is used to find any finished products that are contaminated with metal fragments.

Only one of these processing steps would likely be the best CCP to control this hazard.

1.2 Examples of Critical Control Points

A CCP is a step where a hazard can be prevented, eliminated or reduced to an acceptable level.

Examples of CCPs where a hazard can be **prevented** are:

- Chemical hazards caused by excessive application of a certain food additive can be **prevented** at the step where the ingredient is added.
- Histamine formation in certain fish species can be **prevented** at all steps where the proper use of ice, refrigeration, or managing the time out of refrigeration can prevent the product from being exposed to a temperature above 40°F for an extended period of time.
- Chemical hazards such as drug residues in aquaculture products can be **prevented** at the receiving step by using controls such as supplier declarations or testing.

Examples of CCPs where a hazard can be **eliminated** are:

- Pathogens can be **eliminated** (killed) at the cooking step by controlling the time and temperature used for cooking.
- Metal fragments that may be in the finished product can be **eliminated** at a metal detector step because any product containing metal fragments would be removed from the processing line.
- Parasites can be **eliminated** (killed) at a freezing step by controlling the freezer temperature and how long the product is held at that temperature.

Examples of CCPs where the hazard can be **reduced to an acceptable level** are:

- The possibility that biological hazards, such as pathogens, and chemical hazards, such as natural toxins, can be **reduced to acceptable levels** in shellfish at the receiving step if controls are used to ensure that all shellfish are purchased from certified dealers and are properly tagged to document the product has been harvested from approved waters.
- The possibility that unacceptable levels of environmental chemical hazards such as PCBs will be present in fish can be **reduced to acceptable levels** at the receiving step by ensuring that the fish were not harvested from waters that have been closed by local or state health authorities.
- The possibility of pathogen growth can be **reduced to acceptable levels** at a storage step by controlling cooler temperatures or using adequate ice.

1.3 Multiple CCPs and Multiple Hazards

A single CCP can be used to control more than one hazard. For example, the step where live oysters or clams are received provides an example of when a single CCP could control multiple hazards. Source related hazards for this product such as harvest site pathogens, natural toxins and chemical contaminants could all be controlled at the receiving step by making sure that the shell stock is from an approved source and properly tagged.

In some circumstances, more than one CCP may be needed to control a single significant hazard. For example, receiving and refrigerated storage steps may be CCPs for a histamine hazard. This is because histamine can develop in these fish at any time if there is time and temperature abuse. Any step in the process where there is a potential for significant time/temperature abuse must be identified as a CCP.

Example:

Multiple Hazards and Single CCP

Product = Frozen Shrimp

Hazards = Harvest site pathogens + Chemical Contaminants + Aquaculture Drugs

Single CCP = Receiving

Single Hazard and Multiple CCP

Product = Fresh Hilsha Fish

Hazard = Histamine

Multiple CCP = Receiving + Refrigerated Storage

1.4 CCPs are Product- and Process-Specific

CCPs that have been identified for a product on one processing line may be different for the same product on another processing line. This is because the hazards and their processing controls are impacted by the layout of the plant or processing line, the formulation of the finished product, the process flow diagram or sequence of processing steps, the processing equipment that is used, the sanitation and support programs that are used, and ingredients that may be used. CCP are product- and process-specific.

CCP are product- and process-specific and impacted by:

- Layout of the plant or processing line,
- Finished product formulation,
- Process flow or sequence of processing steps,
- Processing equipment,
- Ingredients,
- Sanitation or other support programs.

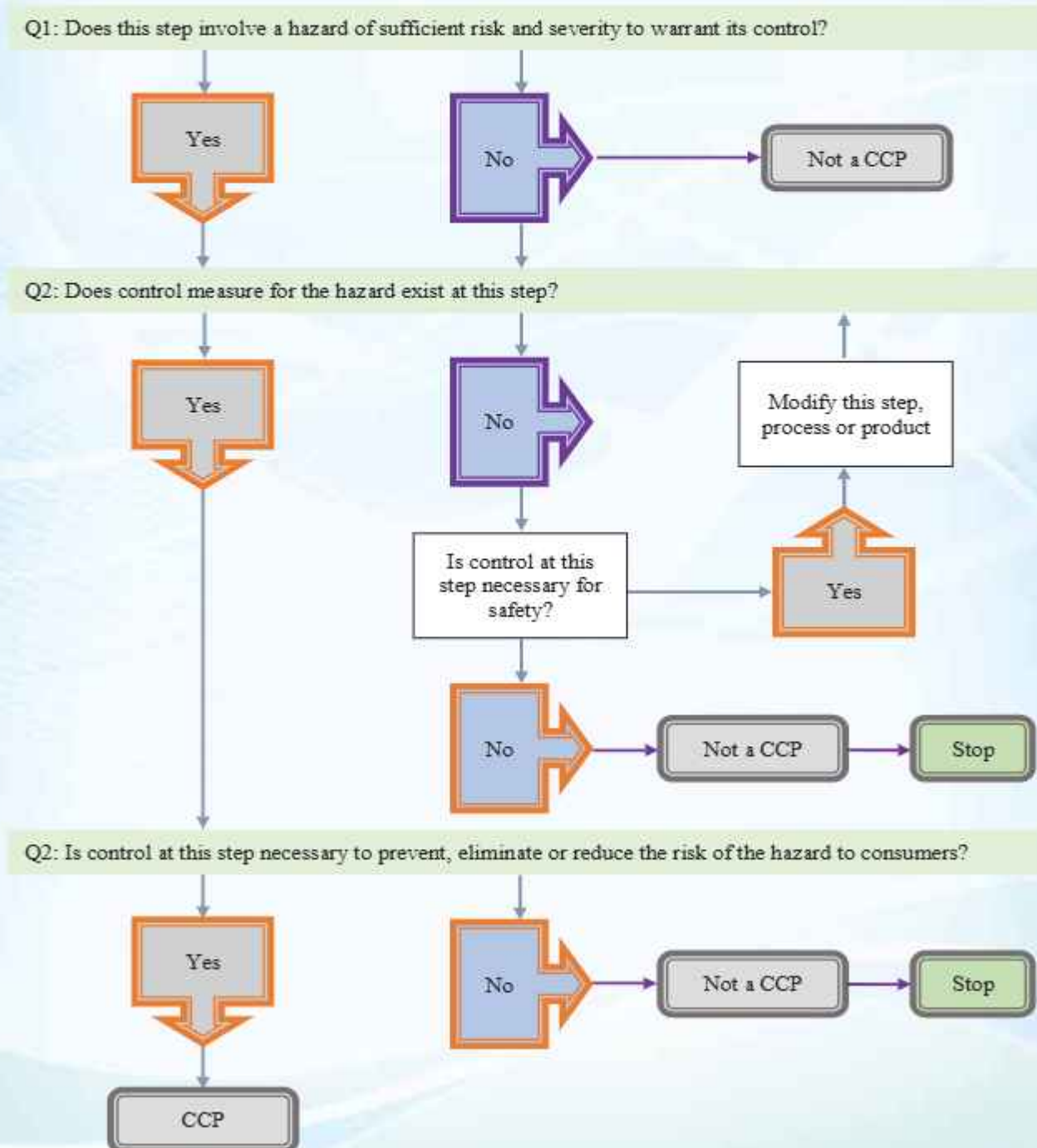
1.5 Tools to Help Identify CCPs

There are several tools available to help identify which steps are likely to be CCPs for various types of hazards.0

Hazard Guides– Hazard Guides provides guidance on likely CCPs for each of the potential seafood safety hazards associated with seafood products.

CCP Decision Tree – Another tool that can help identify which steps are CCPs is the CCP Decision Tree. This tool has a series of questions that can help identify the CCPs in the process. These questions can be applied at each of the processing steps where a significant hazard was identified in the hazard analysis.

Fig: CCP Decision tree



2. Exercise – Determine CCP

2.1 Approach

The instructor should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2.2 Exercise

The instructor should have each "HACCP team" complete Form 2 and identify the critical control points in their selected operation. Each team will then present a report using PowerPoint Slides of the completed Form 2, explaining the team's rationale for answering the associated questions and the determination of CCPs.

**** Exercise CCP**

Session Plan

Day: 05	Session: 5.5	Duration: 60 Minutes
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Session Title: Establish Critical Limits

Learning objectives

Learning objectives

At the end of this session, participants will be able to-

- Understand that Critical Limits (CLs) are a key component of HACCP;
- Know that CLs are established to prevent, eliminate, or reduce specific hazards to an acceptable level;
- Be familiar with the characteristics of CLs being specific, measurable, and time-related;
- Recognize the Source of critical limit;
- Recognize the role of CLs in defining the maximum and/or minimum range of control for a CCP;
- Understand the options of critical limit;
- Explain use of CLs in monitoring the process and taking corrective actions when deviations occur;
- Describe operating & Critical limit;

Appreciate the importance of establishing critical limits for the effectiveness of the HACCP system.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system handout, training notes etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Establish Critical Limits	To establish critical limits through question and answer. Now present and discuss how to establish critical limits using PPT slides and the attached hand-out.	20 Minutes
Step-3	Source of critical limit & options of critical limit	Check participants understanding the Sources of information on Critical limits through Hazard guides & different options for controlling a particular hazard.	15 Minutes
Step-4	Operating Critical limit	Check participants understanding Operating & Critical limit using PPT slides and the attached hand-out.	15 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Principle 3: Establish Critical Limits (CLs)

Critical limits (CLs) must be established for each hazard at each CCP identified in the hazard analysis. This is the third principle of HACCP.

Critical limits are established in Hazard Analysis and Critical Control Points (HACCP) as a means of controlling and preventing food safety hazards. A critical limit represents the boundaries that are used to ensure that a hazard has been controlled (prevented, eliminated, or reduced to an acceptable level) at each CCP.

CLs are specific, scientifically based limits that define the range of acceptable conditions for each critical control point in the food production process. The purpose of critical limits is to ensure that the process is under control and that hazards are prevented or controlled effectively, by monitoring key process parameters at critical control points in the food production process. Examples of critical limits include temperature and time limits for cooking, holding and cooling food, pH levels of food products, and minimum and maximum water activity levels. Critical limits must be based on what science or industry experience has demonstrated is necessary to control the hazard.

Critical Limit: A maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce the occurrence of a food safety hazard to an acceptable level.

1. Information Sources for Establishing Critical Limits

Hazard guides provides critical limit information for most seafood safety hazards. Other information may be needed to establish valid critical limits for a CCP. These other sources of information could include process authorities, scientific studies, trade associations, other state or federal regulations. Sources of information on Critical limits -

Information source	Exam
EU-FVO, FDA, WHO	
Rules and regulations	National & international rules, regulation, guidelines regarding tolerances and action levels
Experts	Process authorities; university food scientists/microbiologists, consultants, equipment manufacturers, sanitarians and trade association
Scientific studies	In-house experiments and contract labs or universities
Scientific information	Journal articles, food science texts, microbiology texts

There are many different types of critical limits. They must be specific for the critical control point and the hazard that is being controlled. Examples of Critical limits for species-related hazards –

Product	Significant hazard	CCP	Critical Limits
Live shellfishes	Natural toxins	Receiving (from farm)	All shellstock tagged with the date and place of harvest, type and quantity of shellfish, and name or registration number of harvest vessel and all shellstock from waters approved by State Shell fish Authority and all shellstock from a licensed harvester

Examples of Critical limits for process-related hazards:

Product	Signifacan hazard	CCP	Critical Limits
Cooked Shrimp	Pathogenic bacteria Growth(<i>Salmonella spp</i> , <i>V. cholera etc</i>). survival	Cooking Step (In Processing Plant)	Time & Temperature Cooking time 3 minutesProduct core temperature 70-72 oC for 3 sec.
Imitation crabmeat	Metal inclusion	Metal detector (after packaging)	No detectable metal fragments in finishedproduct
Hot smoked fish, vacuum packaged	<i>C. botulinum</i> toxin formation (in finished product)	Hot smoking	Internal fish temperature held at or above 63°C for at least 30minutes

2. Critical Limit Options

Processors may have different options for controlling a particular hazard. Each control option usually requires the use of different critical limits. The selection of the best control option and the best critical limit is often driven by practicality and experience. The following examples describe three different options for effective control measures and critical limits that could be applied at a fryer (cooking) CCP to eliminate the hazard of bacterial pathogens in fried fish cakes.

Option No. 1	Option No. 2	Option No. 3
- Product: Fish cakes - Hazard — pathogen survival through cooking - CCP — fryer - Critical limit — no pathogens detected	- Product: Fish cakes - Hazard — pathogen survival through cooking - CCP — fryer - Critical limit — minimum internal temperature of 74°C for 36 seconds	- Product: Fish cakes - Hazard —pathogen survival - CCP — fryer - Critical limit — minimum fryer oil temperature of 177°C - Critical limit — maximum fish cake thickness of 3/4 inch - Critical limit — minimum cook time in the oil of two minutes

Option 1 is not typically the best option. Setting a critical limit such as “no pathogens detected” is rarely appropriate.

Option 2 uses the internal product temperature and time achieved during frying as a critical limit. This critical limit option is more practical than finished product pathogen testing.

It seldom is practical to continually monitor the internal temperature of the food product to ensure conformance with a critical limit. As an alternative, critical limits such as those in Option 3 may establish conditions necessary to ensure that the cooking process achieves the minimum product temperature and time.

3. Operating Limits and Critical Limits

An operating limit allows the detection of a potential problem before a critical limit is violated. Operating limits should not be confused with critical limits. Operating limits are established at a level that would be reached before the critical limit is violated. The process should be adjusted when the operating limit is reached to avoid violating critical limits. These actions are called process adjustments. A processor may use these adjustments to avoid loss of control and the need to take corrective action. Spotting a trend toward loss of control early and acting on it can save product re-work, or worse yet, product destruction.

Operating Limits: Criteria that are more stringent than critical limits and that are used by an operator to reduce the risk of a deviation.

Operating limits may be selected for various reasons:

For quality reasons (e.g., higher cooking temperatures may enhance flavor development or to control organisms that can cause spoilage);

- To avoid deviating from a Critical Limit, processors often establish an Operating Limit that is more stringent than the Critical Limit. For example, a processor could establish a cooking temperature Operating Limit that is higher than the HACCP Critical Limit. If monitoring indicated that temperatures fell below the Operating Limit, the processor would have time to initiate a Process Adjustment to avoid a Critical Limit deviation;
- To account for normal variability (e.g., a fryer with a 5°F variability should be set at least 5°F above the critical limit to avoid violating it).

4. Distinguishing Product Involved in ‘Lots’ or ‘Batches’

Often processing operations handle a quantity of products that are identified as a lot, batch or similar name for the portion of items involved. Likewise, a group of products could be part of a batch, and the batch was part of an initial lot. These terms are useful for routine operations but they can be very significant designations regarding HACCP plans and procedures. For example, when a corrective action is necessary, processors must be able to identify and segregate the affected lots. If lot sizes are big, large quantities of product may require segregation and corrective action despite the fact that only a small amount of product was produced when critical limits were exceeded. Lot size also relates to effective traceability and recalls. Coding production into smaller lots means less product may be involved when violation of a critical limit occurs. Therefore, processors should change codes often and match monitoring frequency with code changes.

5. HACCP Plan Form

A HACCP plan form should be used to ensure that HACCP Principles 3 through 7 are adequately described when the HACCP plan is developed.

The HACCP plan form can be used to:

- List the CCPs from the hazard analysis worksheet in the first column.
- List the significant hazards at each CCP in the second column.
- List the critical limits for each significant hazard in the third column.
- List all elements of monitoring (what, how, frequency, and who) in the fourth column.
- List corrective actions in the fifth column.
- List verification procedures in sixth column.
- List records in the last column.

Form 5: HACCP Plan form

Firm Name: Product:

Critical Control Point (CCP)	Significant Hazard(s)	Critical Limits for each Control Measure	Monitoring				Corrective action	Verification	Records
			What	How	Frequency	Who			

Critical Limits (CLs) are key components of a Hazard Analysis and Critical Control Points (HACCP) plan and are established to ensure that a specific hazard is prevented, eliminated, or reduced to an acceptable level. CLs are specific, measurable, and time-related limits for a CCP that define the maximum and/or minimum range of control to ensure that the hazard is controlled. They are used to monitor the process and ensure that corrective actions are taken when deviations from the CL occur. The establishment of critical limits is essential to ensure the effectiveness of the HACCP system.

Session Plan

Day: 05	Session: 5.6	Duration: 60 Minutes
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Session Title: Exercise – Establish critical limits

Learning objectives At the end of this session, participants will be able to- Establish critical limits	
Methodology: Demonstration, discussion and Q&A	Materials: PPT slides, board, markers, sound system handout, training notes etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	Exercise	Each "HACCP team" should complete the "Critical limits" column on Form 5 of their identified the critical control points in their selected operation. Each team will then prepare flip charts or PowerPoint slides, explaining the critical limits established for each CCP.	25 Minutes
Step-3	Presentations	Each team should present its findings using flip charts or PowerPoint slides.	15 Minutes
Step-5	Summary and Evaluation	Check participants understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

Exercise –Establish critical limits

1. Approach

The facilitator should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2. Exercise

The facilitator should have each "HACCP team" complete the "Critical limits" column on Form 5 and identify the critical control points in their selected operation. Each team will then present a report, using PowerPoint slides, explaining the critical limits established for each CCP.

HACCP PLAN FORM

TYPE OF PRODUCT: 3.E) RAW IQF HL/SHO EZ-PEEL/PTO/PUD/SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution: To be stored and distributed at temperature below -18°C until use

Intended Use & Consumer: Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products)

(1) Critical Control Point	(2) Significant Hazard	(3) Critical Limits for each Preventive measure	(4) What	(5) How	(6) Frequency	(7) Who	(8) Corrective actions	(9) Verification	(10) Record
Raw Materials Receive	Pathogen from incoming raw materials (<i>Salmonella</i> , <i>Y. cholerae</i>)	i) Supplier's certificate indicating that shrimps are from approved farmers following GAP with no possibility of contamination during farming, harvest and post harvest transport.	Presence of certificate with correct contents	Visual Check	Each lot received	Quality control staff	i) Lot rejection for improper or Without certificate.	i) Daily review of monitoring reports and corrective action records ii) Review of Consignment wise microbiological test report of shrimp. iii) Conduct farm visit of 25% existing farmers and all new farmers.	i) Analytical results. ii) Supplier's certificate copy. iii) Corrective action records. iv) Farm visit Doc.
		ii) All baskets must bear a tag that discloses the date, time and place, type and quantity of shrimp and by whom they were harvested. Also the name address and license number of supplier. Including traceability document.	Basket Tag	Visual Check	Each lot	Receive In-charge	ii) Lot rejection	i) Daily receiving record. ii) Weekly review of monitoring reports and corrective action records	i) Receiving tag ii) Corrective action record.

Signature:

Date:

President, HACCP Team

HACCP PLAN FORM

TYPE OF PRODUCT: 3.F) RAW IQF HL SOA/LSO Ez-PEEL/PTO/PUD/SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution: To be stored and distributed at temperature below -18°C until use

Intended Use & Consumer: Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products)

(1) Critical Control Point	(2) Significant Hazard	(3) Critical Limits for each Preventive measure	(4) What	(5) How	(6) Frequency	(7) Who	(8) Corrective actions	(9) Verification	(10) Record
Raw Materials Receive	Aquaculture drug (Antibiotic) side effect (CAP, Nitrofurans, Tetracycline)	Supplier's certificate indicating that shrimps are from approved farmers following GAP without use of any drugs.	Supplier's Certificate	Visual Check	Each lot received	Quality control Staff	No certificate or improper certificate lot is rejected.	i) Daily receive record review. ii) Weekly review of monitoring and corrective action. iii) Review of Consignment wise chemical test report of shrimp. ii) Yearly external analytical report review and conduct farm visit of 25% existing farmers with all new farmers to review drug usage yearly two times or as per FRCP which designed by FIQC.	i) Supplier's certificate copy. ii) Corrective action records. iii) Analytical results. iv) Farm visit Doc.

Signature:

Date:

President, HACCP Team

HACCP PLAN FORM

Monitoring

TYPE OF PRODUCT: 3.G) RAW IQF HL/SH/LSO EZ-PEEL/PTO/PUD/PND SW/BT/BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution : To be stored and distributed at temperature below -18°C until use
Intended Use & Consumer: Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products)

(1) Critical Control Point	(2) Significant Hazard	(3) Critical Limits for each Preventive measure	(4) What	(5) How	(6) Frequency	(7) Who	(8) Corrective action	(9) Verification	(10) Record
Raw Materials Receive	Chemicals : (Dyes Like Crystal Violet, Malachite Green)	Supplier's certificate indicating that shrimps are from approved farmers following GAP without use of any drugs.	Supplier's Certificate	Visual	Each lot received	Quality control Staff	No certificate or improper certificate lot is rejected.	i) Daily receive record review. ii) Weekly review of monitoring and corrective action. iii) Review of Consignment use chemical test report of shrimp. iii) Yearly external analytical report review and conduct farm visit of 25% existing farmers with all new farmers to review drug usage yearly two times or as per FRCP which designed by FIOC.	i) Supplier's certificate copy. ii) Corrective action records. iii) Analytical results. iv) Farm visit Doc.

Signature:

Date:

President, HACCP Team

Monitoring

HACCP PLAN FORM

TYPE OF PRODUCT: 3.H) RAW IQF HL SOHL SO E& PEEL P/TO/PUD/PND SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution :To be stored and distributed at temperature below -18°C until use.

Intended Use & Consumer:Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products).

(1) Critical Control Point	(2) Significant Hazard	(3) Critical Limits for each Preventive measure	(4) What	(5) How	(6) Frequency	(7) Who	(8) Corrective actions	(9) Verification	(10) Record
Metal Detecting	Metal inclusion	No detectable metal fragments in finished products	Presence of metal in the product	Metal detector	Daily at start of operation & Each carton	Supervisor (Frozen Store)	Re check & Rejection	i) Run test of metal detector before checking start and every one hour check the metal detector performance by test kit. ii) Review of daily monitoring & corrective action records iii) Review of yearly Maintenance and calibration records	i) Daily review of monitoring and corrective actions records. ii) Yearly Maintenance and calibration records

Signature:

Date: 05/01/2016

President, HACCP Team

Monitoring

HACCP PLAN FORM

TYPE OF PRODUCT: 3J) RAW IQF HL SO E2-PEEL/PTO/PUD/PND SW BT /BROWN / WHITE SHRIMP/ FW PRAWN FARM RAISED.

Method of storage & distribution: To be stored and distributed at temperature below -18°C until use

Intended Use & Consumer: Use after cooking & all age group of general public (Except the allergic sufferer people because it is a crustacean products).

(1) Critical Control Point	(2) Significant Hazard	(3) Critical Limits for each Preventive measure	(4) What	(5) How	(6) Frequency	(7) Who	(8) Corrective actions	(9) Verification	(10) Record
Pack/Label	Food Allergen	Proper Labelling and its Contains (Every Master or Inner Carton/poly bag must label of Shrimp Market name or Shrimp Picture)	Presence of Shrimp market name or Shrimp picture label	Visual	At the received of the packaging materials on processing area, then start of packaging, during packaging run or if packaging changes (When changing batch or packing materials)	Supervisor (Frozen Store)	Re-arrange & Rejection	Daily review of monitoring & corrective action.	Daily review of monitoring and corrective actions records.

Signature:

President, HACCP Team

Date:

Session Plan

Day: 06	Session: 6.1	Duration: 30 Minutes
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Session Title: Review and feedback of previous day's learning

Learning objectives

At the end of this session, participants will be able to:

- Review the previous day's learning and provide feedback;
- Recall their previous discussions and revise and enhance the learnings from the sessions.
- Correct mistakes and reach a consensus by reviewing the previous day's learning.

Methodology: Discussion and Q&A

Materials: Board, markers, sound system

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	▪ Warm-up activities. ▪ Connecting to the current session.	4 Minutes
Step-2	Content	▪ Review of previous day's activities by a trainee. ▪ Hazard Analysis ▪ Exercise of Hazard Analysis ▪ Determination of CCP ▪ All participants feedback on topics discussed on the previous day.	10 Minutes
Step-3	Content	▪ Review of previous day's activities by a trainee. ▪ Establish of critical limits ▪ Exercise of critical limits ▪ All participants feedback on topics discussed on the previous day.	10 Minutes
Step-4	Summary	▪ Connecting to the next session. ▪ Feedback on participant's discussion with thanking everyone.	6 Minutes

Session Plan

Day: 06	Session: 6.2	Duration: 60 Minutes
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Session Title: CCP monitoring and Corrective actions

Learning objectives

At the end of this session, participants will be able to-

- Understand the concept of CCPs in HACCP;
- Identify the CCPs in a food production process;
- Understand the importance of monitoring CCPs in ensuring food safety;
- Describe knowledge of appropriate monitoring procedures for CCPs;
- Accurately record and evaluate the monitoring results;
- The definition of corrective actions;
- Identifying the potential hazard and its severity;
- Determining the point in the process where the hazard can be controlled;
- Implementing measures to control the hazard;
- Monitoring the effectiveness of the measures;
- Tools to Help Evaluate Product Safety;
- Taking corrective actions when necessary to ensure the hazard is controlled;
- Determine Product Disposition;
- Documenting the corrective actions taken;
- Verifying that the corrective actions have been effective;
- Reviewing and updating the HACCP plan as necessary to ensure it remains effective.
- Procedures for corrective actions, and
- Record-keeping requirements for corrective actions.

Methodology: Demonstration, discussion and Q&A

Materials: PPT slides, board, markers, sound system handouts, training notes etc.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	4 Minutes
Step-2	CCP monitoring	Check participants' understanding about CCP monitoring through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	15 Minutes
Step-3	Corrective actions lecture & exercise	Check participants' understanding about corrective actions through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	5 Minutes
Step-4	Predetermined Corrective Actions	• Define predetermined corrective actions. • Explain why it is important to have predetermined corrective actions. Provide examples of predetermined corrective actions.	5 Minutes

Steps	Main topics of discussion	Session presentation process	Time
Step-5	Components of Corrective Actions	• Discuss the key components of corrective actions. • Emphasize the importance of taking corrective actions that are effective and sustainable. Provide examples of corrective actions.	5 Minutes
Step-6	Tools to Help Evaluate Product Safety	• Introduce the tools that can be used to evaluate product safety. • Explain how these tools can help to identify hazards and take corrective actions.	5 Minutes
Step-7	Determine Product Disposition	• Explain the process of determining product disposition. • Discuss the factors that need to be considered when determining product disposition.	5 Minutes
Step-8	Correct and Eliminate the Cause of the Deviation and Restore Process Control	• Discuss how to correct and eliminate the cause of the deviation. • Explain the importance of restoring process control. • Provide examples of corrective actions for species-related and process-related hazards.	5 Minutes
Step-9	Predetermined Corrective	• Explain the importance of documenting corrective actions. • Discuss the types of records that need to be maintained.	5 Minutes
Step-10	Predetermined Corrective	• Check their understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	6 Minutes

HACCP Principles 4: CCP Monitoring

1. CCP Monitoring

CCP monitoring is used to ensure that a critical limit is met.

Monitoring involves the selection of appropriate measurements or observations at a specified frequency to ensure that a CCP is under control.

Monitoring – A planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record to demonstrate that critical limits have been met.

***Monitoring:** Routine, often episodic measurement, performance analysis, or supervision of a process, activity, or function with the aim of detecting and correcting change or deviation from desirable levels. Data are usually collected, analyzed, and recorded. The monitor or monitoring agent may or may not have the role and responsibility to fine-tune the process, activity, or function aimed at correcting departures from desired levels.*

The purpose of monitoring is to ensure that the critical limit has been met and the food safety hazard is being controlled. Monitoring also provides data for records to document that products were produced in compliance with the HACCP plan. It is important that monitoring procedures are specific for the identified critical limit.

Purpose of Monitoring:

- To ensure that a critical limit is met,
- To provide documentation that critical limits have been met,
- To identify when there is loss of control (a deviation occurs at a CCP)

There are four elements that are required in an effective monitoring system.

- What will be monitored?
- How will monitoring be performed?
- What is the frequency of monitoring?
- Who will conduct the monitoring?

1.1 What will be monitored?

Monitoring may involve measuring a characteristic of the product or process to determine if a critical limit is met at a CCP.

Examples of monitoring measurements could include:

- Cold-storage temperature when cooler temperature is part of the critical limit.
- The pH of an acidifying ingredient when pH is part of the critical limit.
- Line speed and cooker temperature when cook time and temperature are part of the critical limit.

Monitoring may also involve observations to determine if a critical limit is met at a CCP.

Examples of monitoring observations could include:

- Look for a Supplier's certificate that accompanies a lot of raw material when approved source is part of the critical limit.
- Check if fish are surrounded with ice when adequacy of ice is part of the critical limit.
- Check to see that harvest area is listed on a tag attached to a container of molluscan shellfish when approved source is part of the critical limit.

Monitoring Examples:

- Time and temperature of process;
- Time and internal temperature combinations;
- Water activity (aw);
- pH;
- Internal product temperature;
- Salt concentration in brine;
- Metal inclusion screening;

1.2 How will monitoring be performed?

Different methods can be used to monitor critical limits. These methods need to be real-time and accurate.

Using instruments to measure a critical limit quantity is an effective way to conduct monitoring at a CCP. Examples of monitoring instruments could include thermometers, pH meters, water activity meters, data loggers, etc.

Monitoring methods can also involve visually checking what you are monitoring. For example, a visual check for the adequacy of ice; an evaluation of sensory attributes of products; or a visual check of supplier certificates.

Methods:

- *Measurements (quantitative critical limits) or observations (qualitative critical limits);*
- *Needs to be real-time and accurate.*

1.3 What is the frequency of monitoring?

Monitoring frequency will depend on the critical limit and the types of observations and measurements that are needed. The frequency of monitoring can be at regularly scheduled intervals (non-continuous) or continuous.

Non-continuous Monitoring

It is necessary to establish a monitoring interval that ensures critical limits are met. The frequency of non-continuous (periodic) monitoring could be influenced by historical knowledge of the product and process.

Questions that could help determine the correct frequency include:

- How much does the process normally vary (e.g., how consistent is the data)? If the monitoring data shows a great deal of variation, the time between monitoring checks should be short.
- How close are the normal operating values to the critical limit? If the normal values are close to the critical limit, the time between monitoring checks should be short.
- How much product is the processor prepared to risk if the critical limit is exceeded?

Examples of non-continuous monitoring include:

- Visual daily checks that fish are adequately iced.
- Sensory examination for decomposition in histamine-forming seafood at receipt from the vessel.
- End Point Internal Product Temperature (EPIPT) of cooked crab sections.

Continuous Monitoring

When possible, continuous monitoring procedures should be used. Continuous monitoring is generally performed by an instrument that produces a continuous record.

Examples of continuous monitoring could include:

- The time and temperature of a batch cooking process for shrimp shall be continuously monitored and recorded on a temperature-recording chart.
- The temperature of Scombridae fish storage is continuously monitored and recorded.

1.4 Who will Monitor?

Assignment of the responsibility for monitoring is an important consideration when developing a HACCP plan assigned to CCP monitoring can be:

- Line personnel,
- Equipment operators,
- Supervisors,
- Maintenance personnel, or
- Quality assurance personnel.

Personnel responsible for monitoring a CCP should:

- Be trained in the CCP monitoring techniques.
- Fully understand the importance of CCP monitoring.
- Have ready access to the monitoring activity.
- Accurately report each monitoring activity.
- Immediately report critical limit deviations.

Monitoring Procedure:

Monitoring Tools	Cooking Step:	Refrigerated Storage Step:	Acidification Step:	Labelling Step:
Critical Limit for CCP	minimum cooker temperature of 100°C for a minimum of three minutes	all fish completely surrounded by ice	acidity (pH) less than 4.6	product label identifies market name of seafood
• What will be monitored?	cooker temperature and time	adequacy of ice	pH	finished product label
• How will it be monitored?	time/temperature recording device and visual observation	visual	pH meter	visual
• Frequency of monitoring:	continuous with visual check for each batch	twice a day	each batch	and at least every 2 hours or when new containers of labels are opened or rolls of labels are changed.
• Who will monitor?	cooker/operator	cooler person	QC person	packaging manager

1.5 Monitoring Equipment

The selection of the proper monitoring equipment, which could include instruments such as thermometers and rapid test kits, is a major consideration during development of a HACCP plan. There are many different kinds of monitoring instruments or tools that may be appropriate for different critical limits.

The equipment chosen for monitoring at the CCP must be accurate to ensure control of the hazard. Equipment used to monitor critical limits must be calibrated at a frequency that ensures accuracy.

Examples of monitoring equipment could include:

- thermometers
- recorder charts
- clocks
- pH meters
- water activity meters
- data loggers
- metal detectors
- salometer

2. Exercise

2.1 Approach

The instructor should identify three to four "HACCP teams" from among the participants to complete the exercises in the following modules.

2.2 Exercise

The facilitator should have each "HACCP team" complete the monitoring procedures column on Form 5 and identify the monitoring procedures for each CCP. Each team will then present a report, using overhead transparencies, explaining the monitoring procedures.

HACCP Principle 5: Corrective Actions

Corrective Actions are taken when a critical limit is not met. Corrective action is the fifth principle of HACCP.

A HACCP system should be designed to ensure that critical limit deviations are rapidly identified and corrected. The responsibility for taking corrective actions must be assigned to one or more individuals who have a thorough understanding of the operation, the products, the firm's HACCP plan, and the authority to make decisions.

Corrective Action: Procedures to be followed when a deviation occurs.

1. Predetermined Corrective Actions

Predetermined corrective actions provide a "how-to" guide that describes the steps that need to be taken when a critical limit deviation occurs. It may be possible, and is always desirable, to correct the problem immediately. Although it may not be possible to anticipate all the deviations that could happen, corrective actions still need to be taken even when an unanticipated situation occurs.

2. Components of Corrective Actions

There are two essential parts to a corrective action. The objectives of the corrective action are to keep potentially unsafe product from reaching the consumer and to restore control to the process prior to producing more products.

When a deviation is detected, the first action is to identify the product involved. This product should be segregated and evaluated to determine if a food safety hazard exists. If a hazard exists, the affected product must be reworked or destroyed to ensure it will not cause consumer illness.

Process control must also be restored. Corrective actions must bring the CCP back under control. A corrective action should take care of the immediate (short-term) problem as well as provide long-term solutions. The objective is to re-establish control of the process so that production can start again as soon as possible without further deviations.

Corrective action components:

- *Identify the product that was produced during the process deviation, evaluate its safety and determine its disposition.*
- *Correct and eliminate the cause of the deviation and restore process control*

3. Tools to Help Evaluate Product Safety

A qualified individual must be assigned responsibility for evaluating product safety. Not every firm has an expert on staff that can evaluate the safety of products involved in a deviation. It may be necessary to identify additional resources that can help with product safety evaluations. Tools to help evaluate product safety –

- Food Safety Experts
- Production monitoring data/records
- Shellfish Model Ordinance
- Hazard Guides (Fish and Fishery Products Hazards and Controls Guidance June 2022 Edition: Appendix 4: Pathogen Tables - Appendix 5: Guidance Levels)
- Laboratory testing

4. Determine Product Disposition

A proper and thorough safety evaluation is necessary to determine the disposition of the product. It is best to be cautious, but product destruction may not always be necessary. Decisions related to the disposition of the affected product must be based on sound evidence that the deviation did not create a food safety hazard. This evidence must be documented to support the decision. Like other Corrective Actions, if the product is rejected or destroyed, the processor needs to document that this has been done.

Steps to determine the disposition of product –

- Step 1: Determine if the product presents a safety hazard.
- Step 2: If no hazard exists, the product may be released.
- Step 3: If a potential hazard exists, determine if the product can be:
 - Reworked/reprocessed, or
 - Diverted for a safe use.
- Step 4: If a food safety hazard does exist, the product must be rejected or destroyed.

Correct and Eliminate the Cause of the Deviation and Restore Process Control

It is necessary to determine the cause of the deviation to prevent the same problems from occurring again. **When critical limit deviations frequently reoccur, the process and the HACCP plan must be re-evaluated.** The initial cause or causes of the process deviation must be identified and corrected so that process control can be restored.

Corrective actions must identify the cause of the deviation and restore process control.

Corrective actions must be documented to indicate the safety status and consequences for the products and process involved.

5. Documenting Corrective Actions

Corrective actions must be documented. Corrective action records will show how the safety of the product was evaluated and its disposition. This record will also document the actions taken to fix the problem that caused the deviation and restore process control. These records will help the firm identify recurring problems. This information can be used to evaluate and modify the HACCP plan, if necessary.

Sample Corrective action report

Company Name:	Address:
Product Identification:	
Date:	Code or Lot number:
Description of Deviation:	
What Actions were taken to restore order to the process:	
Person (Name and signature) taking action:	
Amount of product involved in deviation:	
Evaluation of product involved with deviation:	
Final disposition of product:	
Reviewed by (name and signature)	Date:

6. Corrective action examples for species-related hazards

Critical control point	Significant hazard	Critical limit	Corrective actions
Receiving aquaculture shrimp from the farm	Aquaculture drugs	Supplier certificate on file (indicating proper drug use)	If: supplier certificate is not on file; Then: reject lot and discontinue using supplier until appropriate, accurate certificate obtained.
Receiving live oyster from the harvester	Natural toxins	All shellstock tagged with the date and place of harvest, type and quantity of shellfish, and name or registration number of harvest vessel and All shellstock from waters approved by State Shellfish Authority and All shellstock from a licensed harvester.	If: shellstock tags are missing and/or do not have required information; Then: reject shellstock. If: harvester not licensed or harvest waters are not approved; Then: reject shellstock and discontinue purchasing from harvester until properly licensed.

7. Corrective action examples for process-related hazards

Critical control point	Significant hazard	Critical limit	Corrective actions
Cooking Step	Survival of Pathogenic Bacteria (Salmonella, Vibrio, Listeria monocytogenes etc.) survival	Cooking time 3 minutes Product core temperature 72° C for 3 minute.	Extend cook time or elevate temp to rectify deviation from limit And Segregate & hold for evaluation
Metal detector (after packaging)	Metal inclusion	No detectable metal fragments in product	If: product is rejected by metal detector; Then: rework product to remove metal if possible and pass-through metal detector or destroy product, and re-calibrate metal detector to determine if it is working properly and adjust as necessary and determine the source of metal and fix the problem.
Hot smoking (vacuum packaged)	Clostridium botulinum toxin formation (in finished product)	Internal fish temperature held at or above 63°C for at least 30 minutes	If: product does not reach required internal temperature for the required time; Then: extend cook time until proper internal temperature is met core-cook product to 63°C for 30 minutes or destroy product, and make repairs/adjustments to equipment to ensure process meets critical limits.

8. Exercise

The facilitator should have each "HACCP team" complete the corrective action column on Form 5. Each team will then present its report, using overhead transparencies, explaining the deviation procedures established for each CCP.

Session Plan

Day: 06	Session: 6.3	Duration: 60 Minutes
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Session Title: Establish Verification Procedures and Record keeping procedures

Learning objectives

At the end of this session, participants will be able to-

- Define verification
- Understand the purpose of verification in the HACCP system;
- Understand Validation is part of verification
- Know the different types of verification activities (e.g. monitoring, testing, auditing);
- Recognize the importance of having a written verification procedure;
- Learn how to determine the frequency and methods of verification;
- Know how to document and record verification results and any necessary corrective actions;
- Be able to assess the effectiveness of the verification procedures and make necessary changes;
- Verification procedures.
- Understand the importance of record-keeping in the HACCP system;
- What records are needed;
- How to develop appropriate records;
- How to conduct a record review;
- Know the types of records that should be kept (e.g. monitoring, testing, corrective action);
- Recognize the need for accurate, complete and legible records;
- Learn how to store and retrieve records;
- Know how to ensure that records are properly maintained and updated;
- Be able to assess the effectiveness of the record-keeping procedures, make necessary changes and how computerized records may be used.

Methodology: Demonstration, discussion and Q&A

Materials: Presentation slides, handout on verification procedures, case studies on verification procedures for specific hazards at a CCP, Exercise worksheet, board, markers, sound system.

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Begin the session by welcoming the participants and connecting with the previous session. Initiate the next step of discussion by highlighting the purpose of the session and the topics to be discussed.	5 Minutes
Step-2	Verification	• Define verification and its importance in the HACCP process. • Explain the types of verification	3 Minutes
Step-3	Validation	• Discuss the importance of validation in the HACCP process. • Provide examples of validation procedures.	3 Minutes

Steps	Main topics of discussion	Session presentation process	Time
Step-4	CCP Verification Activities	• Discuss the various CCP verification activities, including accuracy checks, calibration of process-monitoring devices, targeted sampling and testing, and CCP record review. • Provide examples of accuracy checks and calibration activities. • Emphasize the importance of accuracy and calibration records and reviews.	3 Minutes
Step-5	HACCP Program Verification	• Discuss the importance of verifying the overall HACCP program. • Explain the types of HACCP program verification activities.	3 Minutes
Step-6	Regulatory Verification	• Explain the importance of regulatory verification. • Discuss the role of regulatory agencies in verifying HACCP programs.	3 Minutes
Step-7	Record Keeping Procedure & Exercise	• Check participants' understanding about record/record keeping procedure through question and answer. Now present and discuss the topics using PPT slides and the attached hand-out.	5 Minutes
Step-8	Exercise	• The instructor should guide each "HACCP team" establish the documentation required for the HACCP plan, complete the HACCP record column on Form 5 and identify the specific records that should be kept for each CCP in the HACCP system.	20 Minutes
Step-9	Presentations	Each team will then present flip charts or PowerPoint slides showing the documentation of the HACCP plan and the HACCP records established for each CCP in the HACCP system.	10 Minutes
Step-10	Summary and Evaluation	Check their understanding of the key learning points in this session through questions and answers. End the session by summarizing the topics covered in the session and thanking everyone.	5 Minutes

HACCP Principle 6: Establish Verification Procedure

The sixth principle of HACCP requires that verification procedures be established to assure the HACCP program is effective.

Verification includes the procedures that are needed to ensure that the HACCP plan is designed properly and has been implemented correctly. The validity of the HACCP plan is determined before the plan is implemented. Routine verification is used to determine if the plan is working properly.

***Verification:** Those activities, other than monitoring, that determine the validity of the HACCP plan and that verify the system is operating according to the plan.*

1. Verification

The purpose of the overall HACCP plan is to control food safety hazards. The purpose of verification is to provide a level of confidence that the plan is based on solid scientific principles, is adequate to control the hazards associated with the product and process, and is being followed. A key concept in the verification principle is “Trust what you can verify”.

Verification can be complex because there are several elements associated with this principle. The types of verification activities that may be needed include:

- a) Validation (before the HACCP plan is implemented)
- b) CCP verification (regularly scheduled activities):
 - Calibration of process-monitoring devices,
 - Record review,
 - Targeted sampling and testing.
- c) HACCP system verification (periodic activity):
 - HACCP plan reassessment
 - Microbiological end-product testing and third-party audits
- d) Regulatory verification (periodic activity)

a) Validation

Validation is an essential component of verification and requires substantiation that the HACCP plan, if implemented effectively, is sufficient to control the significant food-safety hazards. Validation of the plan occurs before the plan is actually implemented. The purpose of validation is to provide objective evidence that all essential elements of the plan have a scientific basis and represent a “valid” approach to controlling the food-safety hazards associated with a specific product and process.

***Validation:** The element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.*

Validation involves establishing the scientific basis for the HACCP plan. Strategies that can be used to validate the HACCP plan include:

- using scientific principles and data,
- relying on expert opinion, or
- conducting in-plant observations or tests

A number of different events or situations may affect when validation activities are needed. Validation frequency –

- Before the HACCP plan is implemented
- When factors warrant, such as:
 - changes in raw materials and/or suppliers
 - changes in product or process
 - adverse review findings
 - recurring deviations
 - new scientific information on hazards or control measures
 - on-line observations
 - new distribution or consumer handling practices

Examples of Validation Procedures

- A seafood processor who is trying to determine an effective cook time and temperature to kill *Listeria monocytogenes* in their seafood products may use science-based information on the time and temperature combinations necessary for the destruction of the pathogen in raw seafood products. The length of time at a particular internal product temperature that is needed to accomplish the recommended reduction in the number of *L. monocytogenes* is, in part, dependent upon the food in which it is being heated. It may be possible to establish a shorter process time for a particular food by conducting scientific thermal death time studies, or by obtaining information from scientific studies that proves that the normal levels of this pathogen are lower than the expected levels.
- Processors may need to conduct in-plant thermal validation studies for a specific piece of equipment or process using science-based time temperature scenarios to achieve the necessary reduction in pathogens.
- A validation activity for a primary processor of molluscan shellfish could involve contacting the responsible authorities to identify the location of approved waters for raw shellfish before developing a harvest schedule. These authorities determine the status of harvesting waters using science-based sampling and testing protocols.
- A validation study for a brining process may involve science-based in-plant trials and product testing to determine the variables (e.g., size, fat content and number of fish, salt level in the brine, brining time, etc.) that must be consistently achieved to assure that the required water phase salt will be reached in all finished products.

b) CCP Verification Activities

Several types of verification activities may be necessary for each CCP to ensure that the control procedures used are effective. A CCP verification procedure is needed to ensure that monitoring instruments are accurate and calibrated within appropriate ranges. CCP verification activities may include –

- Calibration of process-monitoring devices
- Calibration record review
- Targeted sampling and testing
- CCP record review

Calibration of Process-monitoring Devices

Accuracy checks and calibration are fundamental to the successful implementation and operation of the HACCP plan. If monitoring devices do not provide accurate measurements, then monitoring results will be unreliable. If this happens, the CCP should be considered out of control since the last documented acceptable accuracy check and/or calibration.

For example, suppose a thermometer is used to measure the temperature of frying oil, which is part of the critical limit at a cooking CCP. The HACCP plan requires monthly calibration of this thermometer. If a scheduled calibration shows that the thermometer is actually reading 10°F less than the standardized thermometer,

the accuracy of all monitoring results since the last monthly calibration is uncertain. Therefore, monitoring results for the last month are unreliable and it is impossible to know if the critical limit has been met during this period of time. Corrective action must be taken to determine if the products produced during this time period are safe and/or need to be recalled.

Calibration and accuracy are different but are related concepts (Slide 10). Ideally a measurement device is both accurate (correct or true) and precise (repeatable or reproducible). The accuracy and precision of a measurement process is usually established by measuring against a traceable reference standard.

Calibration involves determining, by measurement or comparison with two known standards, that the value of each reading on a particular measuring instrument is in fact correct or against a known calibrated instrument. For example, a thermometer could be calibrated by comparing it to a BSTI traceable thermometer at two different temperatures in the range (above and below) in which it will be used.

Accuracy checks determine if the instrument is reading a true or correct value at a single point. For example, routine accuracy checks of a thermometer could involve immersing the probe into an ice slurry to determine if the thermometer measures a temperature of 0°C. (32°F.)

Examples of accuracy checks and calibration activities:

Calibration (Periodic)	Accuracy (Routine)
Thermometer	
A dial thermometer is checked against a standardized (e.g., BSTI traceable) thermometer for two or more temperature points	Thermometer measures the correct temperature of an ice slurry (32°F)
pH Meter	
Meter is adjusted to read between two pH points or buffer standards	pH is measured correctly under conditions in the plant with a single standard
Metal detector	
Instrument is adjusted to detect standard sized metal slugs provided by manufacturer	Detector rejects product with metal standards
Histamine test kit	
Kits are pre-calibrated by the manufacturer	Level of histamine is determined using known standards provided by the manufacturer

Frequency of Accuracy Checks and Calibration - A number of factors should be considered when determining the frequency of accuracy checks and calibration for monitoring devices that is needed. Some factors to consider when determining the frequency for thermometer accuracy checks and calibration include:

- **Inherent reliability:** Daily accuracy checks may be needed for the least reliable instruments (i.e., dial thermometers and bi-metallic). Periodic checks may be sufficient for more reliable instruments (i.e., digital thermometers with a history of good performance).
- **Manufacturer recommendation:** The design and expected conditions of use for each individual product is considered when manufacturers make accuracy and calibration recommendations. This information should be used to determine the frequency that is needed for these activities in the HACCP plan.

Accuracy and Calibration Records and Reviews

Records must be kept to document the results of accuracy checks and calibrations of monitoring devices. Reviewing these records may involve checking the dates and methods of calibration and the test results (e.g., equipment passing or failing). These reviews are part of the plant's verification activities. Inspectors and third-party auditors may also review calibration records.

Accuracy checks and calibration records must:

- 1) Document results of accuracy checks and calibration procedures
- 2) Provide a reference to the standard
- 3) Be reviewed by qualified, trained personnel

Targeted Sampling and Testing

Verification may also include targeted sampling, testing, and other periodic activities. For example, vendor compliance with a standard may be checked by targeted periodic sampling and testing when receipt of material is a CCP and purchase specifications outlined in a supplier guarantee are used as a critical limit.

Other examples of targeted sampling and testing:

- An initial, followed by quarterly sampling of shrimp at receiving and laboratory analysis for sulfite levels to verify that the incoming products do not exceed food safety specifications for this food additive.
- Periodic sampling and testing of water phase salt levels in finished smoked fish products to verify that the brining process is achieving the required water phase salt levels.
- Periodic sampling and histamine testing of fish from a harvest vessel to verify that the elements of the vessel's handling and sampling procedures included in the processor's critical limits do not create conditions that could lead to histamine formation.
- Periodic sampling and microbiological testing of cooked products to verify that the cooking process is sufficient to kill pathogens of concern.

CCP Record Review

All monitoring and corrective action records be reviewed within a week from the time that they are generated by a trained person. This review is a verification activity. These records are valuable tools that document that CCPs are operating within established safety parameters and that deviations are handled in a safe and appropriate manner.

However, records alone are meaningless unless someone in a supervisory capacity review them on a periodic basis to "verify" that critical limits have been met and the HACCP plan is being followed.

c) HACCP Program Verification

In addition to the verification activities for CCPs, strategies should be developed for scheduled verification of the complete HACCP system. The frequency of a system-wide verification or reassessment shall be yearly, at a minimum, or whenever there is a system failure or a significant change in the product or process. The HACCP team is responsible for ensuring that this verification activity is performed. The HACCP team may contract with an independent third party to conduct system-wide verification activities.

Activities that should be conducted in a **system-wide HACCP plan verification** include:

- Check the accuracy of the product description and flow diagram.
- Check for new guidance or scientific information related to critical limits or other HACCP principles.
- Check that CCPs are monitored as required by the HACCP plan.
- Check that processes are operating within established critical limits.
- Check that appropriate corrective actions have been taken and verification activities have been completed.
- Check that records are completed accurately and at the time intervals required.
- Review sanitation records and other procedures that support the HACCP system.
- Review of consumer/customer complaints related to food safety.

During a system-wide HACCP plan verification, conduct a review of records to determine if the following have occurred:

- Monitoring activities have been performed at the locations specified in the HACCP plan.
- Monitoring activities have been performed at the frequencies specified in the HACCP plan.
- Corrective actions have been performed whenever monitoring indicated deviation from critical limits.
- Equipment has been calibrated at the frequencies specified in the HACCP plan.
- Check to be sure that all records are reviewed by a trained person within a week of the time they were generated.

d) Regulatory Verification

The major role of regulatory agencies in a HACCP program is to verify that HACCP plans are effective and are being followed and to make sure processors are in compliance with HACCP and other regulations. This inspection-based verification activity occurs on-site in the processing facility that has implemented the HACCP plan.

Verification procedures conducted by a regulatory agency may include:

- Review of the HACCP plan and any modifications
- Review of CCP monitoring records
- Review of corrective action records
- Review of the verification records
- Visual inspections of operations to determine if the HACCP plan is followed and records are properly maintained
- Random sample collection and analysis
- Evidence of training and that all training requirements have been met

Establishing a Schedule for Verification Activities

The following table provides an example of a company-established HACCP verification schedule. The frequency of all verification activities can change over time. A history of review findings that indicate that the processes are consistently in control may justify reducing the frequency. On the other hand, adverse findings, such as inconsistent monitoring activities, inconsistent record keeping, or improper corrective actions may indicate that more frequent verification reviews are necessary and/or that the HACCP plan may need to be modified.

Verification activities scheduling	Yearly or upon HACCP program change	Responsibility	Reviewer
Verification activities scheduling	Yearly or upon HACCP program change	HACCP coordinator	Plant manager
Initial validation of HACCP plan	Prior to and during initial implementation of plan	Independent expert(s)	HACCP team
Reassessment of HACCP plan	When critical limits changed, significant changes in process, equipment changes, after system failure, etc.	Independent expert(s)	HACCP team
Verification of CCP monitoring as described in the plan (e.g., monitoring of patty cooking temperature)	According to HACCP plan (e.g., once per shift)	According to HACCP plan (e.g., line supervisor)	According to HACCP plan (e.g., quality control)
Review of monitoring, corrective action records to show compliance with the plan	Weekly	HACCP trained person	HACCP trained person
Comprehensive HACCP system verification	Yearly	HACCP team and/or independent expert(s)	HACCP team

Examples of Verification Activities for Specific Hazards at a CCP

Examples of appropriate verification procedures for various hazards at specific CCPs are provided in the following table. The verification procedures must be directly related to the critical limits, monitoring procedures and corrective action strategies identified in the HACCP plan.

Significant hazard	CCP	Critical limits	Verification
Aquaculture drugs	Receiving (from farm)	Suppliers certificate on file (indicating proper drug use).	Visit new suppliers within a year and existing suppliers on a pre-determined schedule to review drug use policies; and Conduct quarterly sampling of raw material and test for drug residue likely to be present; and All records will be reviewed by a HACCP trained person once per week.
Natural toxins	Receiving (from harvester)	All shellstock tagged with the date and place of harvest, type and quantity of shellfish, and name or registration number of harvest vessel; and all shellstock from waters approved by State Shellfish Authority; and all shellstock from a licensed harvester.	Review all monitoring and corrective action records once per week.
Histamine	Receiving (from supplier)	Fish are completely surrounded by ice.	Check the accuracy of new thermometers before they are used and daily thereafter and calibrate thermometers once per year; and Check internal temperature of iced fish at receipt before accepting fish from new suppliers and quarterly for existing suppliers to verify adequacy of ice; and All records will be reviewed by a trained person once per week.
C. botulinum toxin formation (in finished product)	Hot smoking	Internal fish temperature held at or above 630 C for at least 30 minutes.	Check the accuracy of the smokehouse temperature sensor before it is used and daily thereafter and calibrate at least once per year; and all records will be reviewed by a trained person once per week.

Pathogen growth	Cooler storage	Cooler temperature not to exceed 4.50 C.	Check the accuracy of the cooler temperature sensor before it is used and daily thereafter and calibrate at least once per year; and All records will be reviewed by a trained person once per week.
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2. Exercise

The instructor should have each "HACCP team" complete the verification column on Form 5 and identify the verification procedures for each CCP. The teams should also identify procedures for validating the HACCP plan. Each team will then present a report, using overhead transparencies, explaining the verification procedures established for each CCP and for validation of the HACCP plan.

HACCP Principle 7: Record Keeping Procedures

Accurate recordkeeping is an essential part of a successful HACCP system. Recordkeeping is the seventh principle of HACCP.

1. Types of Records Needed

Written records provide documentation of the HACCP plan, and demonstrate that critical limits have been met and appropriate corrective actions and verification procedures have been taken. Types of records are needed in a HACCP system –

- a) The HACCP plan and supporting documentation
- b) CCP Monitoring records
- c) Corrective Action records
- d) Verification records
- e) Sanitation Control records

The FDA Seafood HACCP regulation requires firms to retain HACCP records for one year for fresh products and for two years for frozen or processed products with extended shelf-life. This regulation also requires that all records, plans, and procedures specified in a firm's HACCP plan shall be made available for review and copying by public health officials at reasonable times.

a) The HACCP Plan and Supporting Documents

The written HACCP plan is a required record that describes exactly how all significant food safety hazards will be controlled. Examples of documents that support the critical limits in a HACCP plan could include:

- Data from published scientific studies that demonstrate the adequacy of the control measures used to inhibit bacterial pathogen growth,
- Data from studies conducted by a processing authority to establish the safe shelf life of the product (if age of the product can affect safety),
- Data from an equipment manufacturer and an in-plant study conducted by a processing authority to establish the critical limit variables necessary for a cooking process to destroy bacterial pathogens.
- Data from an in-plant study conducted to determine the critical limit variables necessary to ensure that a brining process consistently achieves the minimum water phase salt levels necessary to prevent C. botulinum toxin production.

Examples of documents that support the overall HACCP plan and its strategies to control food safety hazards could include:

- A list of the firm's HACCP team and their individual responsibilities
- The information gathered in the preliminary steps used to develop the HACCP plan
- Pre-requisite programs including GMP and sanitation control procedures
- A copy of the firm's written hazard analysis worksheets

b) CCP Monitoring Records

Monitoring records show that critical limits are being met, and if not met, when appropriate corrective actions are needed. Each monitoring record must be designed to capture the information required to document that the critical limit has been met at the CCP.

CCP monitoring records are used to document that food safety hazards have been properly controlled at each CCP.

Information required on CCP monitoring records –

- Title of record (e.g., Shellfish Receiving Log)
- Firm name and location
- Product identification (if applicable)
- Date and time of monitoring observation
- Actual measurement or observation taken
- Signature or initials of the person performing the monitoring activity
- Signature of the trained person reviewing the monitoring record and the date of review

Examples of Monitoring Records for Specific Hazards at a CCP

Monitoring records must be designed to capture the measurements or observations that are included in the critical limit. Examples of the relationship between a CCP, critical limit, and monitoring records could include:

Significant hazard	Critical Control Point	Critical limits	Monitoring record
Aquaculture drugs	Receiving (from farm)	Suppliers certificate on file (indicating proper drug use).	Suppliers certificate on file (indicating proper drug use)
Natural toxins	Receiving (from harvester)	All shellstock tagged with the date and place of harvest, type and quantity of shellfish, and name or registration number of harvest vessel; and all shellstock from waters approved by State Shellfish Authority; and all shellstock from a licensed harvester.	Shellfish receiving log
Histamine	Receiving (from supplier)	Fish are completely surrounded by ice.	Histamine fish receiving log
<i>C. botulinum</i> toxin formation (in finished product)	Hot smoking	Internal fish temperature held at or above 145°F for at least 30 minutes.	Smokehouse temperature record
Pathogen growth	Cooler storage	Cooler temperature not to exceed 40°F.	Cooler storage log

Examples of CCP Monitoring Records

Processors must design a form for each record listed in their HACCP plan to capture the information that is necessary to document monitoring results which show that critical limits have been met, what corrective actions have been taken, and that the necessary verification procedures have been completed. Because conditions in each facility are different, there is no single form that will be appropriate for all operations.

Routine CCP Monitoring Records

For example - Daily Cooker Temperature Log Form

This form documents the periodic recording of time and temperature under normal operating conditions of a cooker.

Form Title: Daily cooker temperature log						
Firm Name:				Firm location:		
Product identification: Cooked, peeled shrimp 21-25						
Critical Limits: $\geq 212^{\circ}\text{F}$ for ≥ 3 minutes				Monitoring activities:		
Date	Time	Line number product code	Cooker temp ($^{\circ}\text{F}$)	Cook time (minutes)	Critical limit met (Yes/No)	Line operator (Initials)
Reviewer signature:				Date of review:		

For example – weigh/pack/label log

This form documents the proper use of labels that identify potential hazards associated with the product or the product ingredients. Firms should affix one copy of the current label used to each report.

Form Title: Weigh/Pack/Label log					
Firm Name:			Firm location:		
Product identification: Fresh mahi-mahi Fillets					
Critical Limits: Proper label –seafoodproduct market name and ingredients			Monitoring activities:		
Date	Time	Lot number	Label applied (Yes/No)	Label type (description)	Line operator (Initials)
Reviewer signature:			Date of review:		

c) Corrective Action Records

A corrective action must be taken each time a critical limit is not met and a corrective action record must show what products were affected, how the safety of these products was evaluated, the disposition of the affected product, the cause of the deviation, and how it was fixed.

Corrective actions records must capture information similar to that required for monitoring records, including:

- Product identification (e.g., product description, amount of product on hold)
- Description of the critical limit deviation
- Corrective action(s) taken including the final disposition of product and actions taken to prevent recurrence
- Results of the evaluation or testing of product placed on hold, if necessary
- Name and signature of the person responsible for the corrective action(s)
- Name and signature of the person reviewing the corrective action(s) report

Corrective Action Report

This is an example of a corrective action form that is used to document the action taken when a critical limit is exceeded.

Form title: Corrective action report form			
Firm name:		Firm Location:	
Date:	Line number:	Lot number:	Code number:
Date and time of process deviation:			
Describe the process deviation and what happened to the product?			
What action (s) was taken to restore order to the process?			
Name and signature of person reporting deviation and responsible for taking the correction action:			
Amount of product affected by the process deviation:			
Evaluation of product involved by the process deviation:			
Final disposition of the affected product:			
Reviewer signature:		Date of review:	

d) Verification Records

Records of routine and periodic verification activities must be kept to demonstrate that the HACCP plan has been implemented properly, monitoring measurements or observations are accurate and reliable, and the HACCP system is working as intended. Different records may be needed to capture the verification information that is specified in the HACCP plan.

Examples of records for routine verification activities might include:

- Logs that document the results obtained when routine checks are made of the accuracy of thermometers, pH meters or other instruments used to monitor critical limits;
- Record review signature line and date on monitoring records to document the weekly review of monitoring and corrective action records by a trained person.

Examples of records for validation or periodic verification activities might include:

- A report that describes modifications made to the HACCP plan because of a change in products, ingredients, formulations, processes, or packaging and distribution methods;
- Processor audit records verifying supplier compliance with guarantees or certifications;
- Results of microbiological, chemical or physical tests of raw materials, in process or finished products, or the plant environment;
- Results of equipment-evaluation tests, heat penetration or temperature distribution studies for thermal processes;
- Results from third-party audits or regulatory agency inspections.

Routine Verification Records

Daily Thermometer Accuracy Log. This form documents the daily accuracy check of all thermometers used in the daily process monitoring operations.

Form Title: Daily thermometer accuracy log					
Firm Name:			Firm location:		
Product identification:					
Verification:					
Date	Time	Instrument number	Boiling water check	Critical limit met (Yes/No)	Line operator (Initials)
Reviewer signature:			Date of review:		

Quarterly Thermometer Calibration Log. This form records the quarterly calibration check of thermometers

Form Title: Thermometer calibration log					
Firm Name:			Firm location:		
Product identification:					
Verification:					
Date	Instrument number	Method of calibration	Calibration results	Critical limit met (Yes/No)	Line operator (Initials)
Reviewer signature:			Date of review:		

Periodic Verification and Validation Records

Finished Product Microbiological Evaluation Report. This report documents the results of finished product laboratory analyses for total plate count (TPC), coliform bacteria, *Escherichia coli*, *Staphylococcus aureus* and *Salmonella*.

Form Title: Product microbiological evaluation report						
Firm Name:				Firm location:		
Product identification:						
Verification:						
Date of sampling	Line number	Total plate count (cfu/g)	Total coliforms (MPN/g)	<i>E. coli</i> (Pos./Neg.)	<i>S. aureus</i> (Pos./Neg.)	<i>Salmonella</i> (Pos./Neg.)
Reviewer signature:				Date of review:		

Raw Product Chemical Evaluation Report. This report documents the results of laboratory analysis for sulfites in finished products.

Form Title: Chemical evaluation report			
Firm Name:		Firm location:	
Product identification:			
Verification:			
Date	Line number	Sulfites (ppm)	Line operator (Initials)
Reviewer signature:		Date of review:	

e) Sanitation Control Procedures (SCP) Records

The SCP records include the required routine monitoring and corrections for the 8 key sanitation areas. Likewise, they must include the accompanying training records for qualified individuals.

Exercise

The instructor should have each "HACCP team" establish the documentation required for the HACCP plan, complete the HACCP record column on Form 5 and identify the specific records that should be kept for each CCP in the HACCP system. Each team will then present a report, using overhead transparencies, showing the documentation of the HACCP plan and the HACCP records established for each CCP in the HACCP system.

অধিবেশন পরিকল্পনা

দিন: ০৬	অধিবেশন: ৬.৪	সময়: ১০.৪৫-১১.৪৫	মেয়াদ: ৬০ মিনিট
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অভীষ্ট দল: মৎস্য অধিদপ্তরের কর্মকর্তাবৃন্দ

শিরোনাম: দুর্যোগ ব্যবস্থাপনা

লক্ষ্য: দুর্যোগ ব্যবস্থাপনা সম্পর্কে অংশগ্রহণকারীগণকে প্রশিক্ষণ দেয়া হবে যাতে তাঁরা দুর্যোগ ব্যবস্থাপনার মৌলিক ধারণা, পরিভাষা, ঝুঁকি শনাক্তকরণ ও প্রশমনে করণীয় সম্পর্কে বলতে পারেন।

শিক্ষণের উদ্দেশ্য:

এ অধিবেশন শেষে অংশগ্রহণকারীগণ-

- দুর্যোগ সম্পর্কে মৌলিক ধারণা এবং দুর্যোগ ব্যবস্থাপনায় ব্যবহৃত পরিভাষাসমূহ বলতে পারবেন;
- দুর্যোগের কারণ ও দুর্যোগের ফলাফল সম্পর্কে বলতে পারবেন;
- দুর্যোগ ও দুর্যোগের ঝুঁকিসমূহ শনাক্তকরণ ও ঝুঁকি হ্রাসে ব্যবস্থাপনা সম্পর্কে বলতে পারবেন।

অধিবেশনের আলোচ্য	প্রশিক্ষণ কৌশল	সময়
ভূমিকা		
১.পূর্ববর্তী অধিবেশন 'মাঠ পরিদর্শন প্রতিবেদন উপস্থাপন ও পর্যালোচনা'র সূত্র ধরে এ অধিবেশনের আলোকপাত ও অংশগ্রহণকারীদের স্বাগত জানানো। ২.বর্তমান অধিবেশনের আলোকপাত ও উদ্দেশ্যের ব্যাখ্যা (জ্ঞাত এবং প্রাসঙ্গিক কোন গল্প/ঘটনা/বিষয় বর্ণনার মাধ্যমে এ অধিবেশনের আলোকপাত)। ৩.এ অধিবেশনের কার্যক্রম, কৌশল ও সময় সম্পর্কে জানানো। ৪.উদ্দেশ্য ও গুরুত্বসহ অধিবেশনের মূল বিষয় আলোচনার মাধ্যমে অংশগ্রহণকারীদের মাঝে আগ্রহ সৃষ্টি করা।	বক্তৃতা	৪ মিনিট
বিষয়বস্তু		
দুর্যোগ সম্পর্কে মৌলিক ধারণা ও পরিভাষাসমূহ: প্রশ্নোত্তরের মাধ্যমে দুর্যোগ সম্পর্কে মৌলিক ধারণা ও দুর্যোগ ব্যবস্থাপনায় ব্যবহৃত পরিভাষা সম্পর্কে অংশগ্রহণকারীদের বর্তমান ধারণা যাচাই করুন। এবার পিপিটি ব্যবহার করে ও সংযুক্ত হ্যান্ডআউট অনুযায়ী দুর্যোগ সম্পর্কে মৌলিক ধারণা ও দুর্যোগ ব্যবস্থাপনায় ব্যবহৃত পরিভাষাসমূহ ধারাবাহিকভাবে উদাহরণসহ উপস্থাপন ও আলোচনা করুন। দুর্যোগের ঝুঁকিসমূহ শনাক্তকরণ ও দুর্যোগ ঝুঁকি হ্রাসে ব্যবস্থাপনা: প্রশ্নোত্তরের মাধ্যমে উপকূলীয় এলাকায় স্থানীয় দুর্যোগ ও দুর্যোগের ঝুঁকিসমূহ শনাক্তকরণ ও দুর্যোগ ঝুঁকি হ্রাসে ব্যবস্থাপনা সম্পর্কে অংশগ্রহণকারীদের বর্তমান ধারণা এবং বোধগম্যতা যাচাই করুন। এরপর পিপিটি ব্যবহার করে ও সংযুক্ত হ্যান্ডআউট অনুযায়ী স্থানীয় দুর্যোগ ও দুর্যোগের ঝুঁকিসমূহ শনাক্তকরণ ও দুর্যোগ ঝুঁকি হ্রাসে ব্যবস্থাপনা উপস্থাপন করুন। “দুর্যোগ বিষয়ক স্থায়ী আদেশাবলি ২০১৯”- এ নির্দেশিত দুর্যোগকালীন মৎস্য অধিদপ্তরের কার্যক্রমসমূহ: ঝুঁকি হ্রাস কার্যক্রম: জরুরি সাড়াদান: (১) সাড়াদান প্রস্তুতি পর্যায় (২) সতর্কীকরণ/ইশিয়ারি পর্যায় (৩) দুর্যোগ পর্যায় (৪) পুনর্বাসন ও পুনর্গঠন পর্যায়	বক্তৃতা ও প্রশ্নোত্তর	৫০ মিনিট

দুর্যোগ ব্যবস্থাপনার সঙ্গে সম্পর্কিত জাতীয় আইন ও নীতিমালা: • দুর্যোগ ব্যবস্থাপনা আইন, ২০১২ • উপকূলীয় অঞ্চল নীতি, ২০০৫ • দুর্যোগ ব্যবস্থাপনার জন্য জাতীয় পরিকল্পনা, ২০০৮-২০১৫ • জাতীয় অভিযোজন কর্মপরিকল্পনা, ২০০৫ • জাতীয় দুর্যোগ ব্যবস্থাপনা নীতি ২০১৫ • জাতীয় দুর্যোগ ব্যবস্থাপনার জন্য পরিকল্পনা ২০১৬-২০২০ • দুর্যোগ বিষয়ক স্থায়ী আদেশাবলি ২০১৯		
সারসংক্ষেপ		
প্রশ্নোত্তরের মাধ্যমে এ অধিবেশনের মূল শিক্ষণীয় বিষয়সমূহের বোধগম্যতা যাচাই করুন। সকলেই হ্যান্ডআউট পেয়েছেন কি না তা যাচাই করুন। অধিবেশনে আলোচ্য বিষয়ের সারসংক্ষেপ করে পরবর্তী অধিবেশনের আলোকপাত এবং সকলকে ধন্যবাদ জানিয়ে অধিবেশন শেষ করুন।	বক্তৃতা	৬ মিনিট
সহায়ক সামগ্রী বোর্ড, মার্কার, মাল্টিমিডিয়া, হ্যান্ডআউট		
প্রশিক্ষক বা সহায়কের প্রতি বিশেষ নির্দেশনা: বিষয়বস্তু অংশে প্রশিক্ষক বা সহায়ক শিক্ষণীয় বিষয়বস্তুর আলোকে কী, কেন, কোথায়, কখন, কার দ্বারা, কিভাবে ও সতর্কতা, বিশেষ বক্তব্য বা নির্দেশনা গুরুত্বসহ উপস্থাপন করবেন।		

দুর্যোগ ব্যবস্থাপনা

দুর্যোগ সম্পর্কে মৌলিক ধারণা ও পরিভাষাসমূহ

দুর্যোগ:

দুর্যোগ এমন একটি চরম ঘটনা বা পরিস্থিতি যা মানুষ ও তার পারিপার্শ্বিকতাকে ক্ষতিগ্রস্ত করে এবং স্বাভাবিক জীবনধারাকে বিপর্যস্ত করে এমন পর্যায়ে নিয়ে যায় যা ঐ আক্রান্ত সমাজের পক্ষে এককভাবে মোকাবেলা করা কষ্টসাধ্য বা ক্ষেত্র বিশেষে অসম্ভব হয়ে পড়ে। ফলে স্বাভাবিক অবস্থা ফিরিয়ে আনার জন্য ঐ ক্ষতিগ্রস্ত সমাজের বাইরের সাহায্য সহযোগিতার প্রয়োজন হয়। উদাহরণ: বন্যা, খরা, নদী ভাঙ্গন, হঠাৎ বন্যা ইত্যাদি। প্রকৃতি বা মানুষের দ্বারা সংগঠিত এমন একটি ঘটনা যা চলমান স্বাভাবিক সমাজ জীবন ও কৃষি কর্মকাণ্ডকে মারাত্মকভাবে ব্যাহত করে এবং মানুষ, সম্পদ ও পরিবেশের ব্যাপক ক্ষতি সাধন করে যা মোকাবেলায় সমাজকে বিশেষ পদক্ষেপ গ্রহণ করতে হয়।

দুর্যোগের কারণসমূহ

- প্রাকৃতিক দুর্যোগসমূহ প্রকৃতিগত কারণেই সাধারণত হয়ে থাকে। যেমন ঘূর্ণিঝড় ও টর্নেডো যথাক্রমে সমুদ্রপৃষ্ঠে ও স্থলভাগের বায়ুর চাপের পার্থক্যের কারণে সংঘটিত হয়ে থাকে।
- বন্যা সাধারণত সামুদ্রিক জোয়ার, পাহাড়ি ঢল ও অতি বৃষ্টিপাতজনিত কারণে হয়ে থাকে। আবার খরা অনাবৃষ্টি এবং ভূগর্ভস্থ পানির স্তর অধিক নীচে নেমে যাওয়ার জন্য হয়ে থাকে।
- অতিবৃষ্টি, খরস্রোত এবং পাহাড়ি ঢলের পানির প্রবল স্রোতে নদী ভাঙ্গন হয়ে থাকে।
- ভূগর্ভস্থ পানিতে আর্সেনিক পদার্থ প্রকৃতিগতভাবেই থাকে।
- মানবসৃষ্ট কারণেও প্রাকৃতিক দুর্যোগসমূহ হয়ে থাকে এবং বৃদ্ধি পেয়ে থাকে। বিজ্ঞানের উৎকর্ষতার সাথে সাথে বিভিন্ন যান্ত্রিক দূষণ যেমন- কলকারখানার ধোঁয়া ও বর্জ্য পদার্থ, বিভিন্ন স্থল-যান, নৌযান ও আকাশ যানের নির্গত ধোঁয়া, ডায়নামা, এয়ারকুলার, বৃক্ষ নিধন ইত্যাদি কারণে গ্রিন হাউসের প্রভাব ইত্যাদি বেড়েই চলেছে।
- বাড়িঘর, রাস্তাঘাট, বাঁধ, সেতু, কালভার্ট ইত্যাদি অপরিচ্ছিন্নভাবে নির্মাণের ফলে ঘূর্ণিঝড় ও জলোচ্ছ্বাস, বন্যা, খরা, নদী ভাঙ্গন ইত্যাদি বৃদ্ধি পাচ্ছে।
- ব্যাপকহারে খাবার পানি ও ফসলের জমিতে সেচের পানি ভূগর্ভ হতে প্রতিনিয়ত উত্তোলনের ফলে আর্সেনিকের প্রভাব বৃদ্ধি পাচ্ছে।

দুর্যোগের ফলাফল

জীবন, সম্পদ ও পরিবেশের ক্ষতি

- আক্রান্ত জনগোষ্ঠীর অনেকেই মারা যেতে পারে বা আহত হতে পারে।
- সম্পদ, যেমন- অর্থনৈতিক সম্পদ, উৎপাদনের উপকরণ, ফসল, প্রাণিসম্পদ; ঘরবাড়ি, দালানকোঠা, রাস্তাঘাট, পানি সরবরাহ ও পয়ঃনিষ্কাশন কাঠামো ও অন্যান্য ভৌতকাঠামো ক্ষতিগ্রস্ত হতে পারে।
- পরিবেশ বিপর্যস্ত হতে পারে, যেমন- বনভূমির গাছপালা উপড়ে পড়ে, জলাভূমি আবর্জনায় ভরে যায়, ফসলি জমি বালি চাপা পড়ে ও পানির প্রাকৃতিক উৎস লবণাক্ত ও দূষিত হয়ে যায়।
- এই ক্ষয়ক্ষতি সেবা ব্যবস্থা, জীবিকা ও সামাজিক কাজকর্ম অচল করে দিতে পারে। আর এর প্রভাবও হয় সুদূরপ্রসারী। পুনর্বাসন কার্যক্রমের মাধ্যমে এই ক্ষতিগুলো পূরণ করা হয়। এর জন্য ক্ষতি নিরূপণ করতে হয় এবং যথেষ্ট পরিমাণ সম্পদ সমাবেশ দরকার হয়। পুনর্বাসন কাজের উল্লেখযোগ্য অংশ থাকে ভৌতকাঠামো নির্মাণ, যেমন- রাস্তাঘাট মেরামত বা তৈরি। পুনর্নির্মাণের কাজগুলো সাধারণত দীর্ঘমেয়াদী পরিকল্পনার মাধ্যমে করা হয়ে থাকে।

সেবা ব্যবস্থা, জীবিকা ও সামাজিক কাজকর্মে বিঘ্ন

- পানি সরবরাহ, পয়ঃনিষ্কাশন, বিদ্যুৎ বিতরণ, যোগাযোগ, চিকিৎসা কেন্দ্র ও স্কুল-কলেজ অচল হয়ে পড়ে।
- চাষাবাদ, কলকারখানা, হাটবাজার ও কেনাবেচা বন্ধ হয়ে যায়।
- সামাজিক কাজকর্ম, যেমন- বিনোদন, খেলাধুলা, উৎসব, পালা-পার্বণ ও সামাজিক অনুষ্ঠান বন্ধ হয়ে যায়।

সেবা এবং অর্থনৈতিক ও সামাজিক কাজকর্ম ব্যাহত হলে খাবার, পানি, স্যানিটেশন, আশ্রয়, চিকিৎসা ও শিক্ষার প্রাপ্যতা কমে যায়। এর ফলে আক্রান্ত জনগোষ্ঠী বঞ্চনার শিকার হয় ও দুর্দশায় ভোগে। পুনর্বাসন কার্যক্রমের মাধ্যমে এই সেবা ও সুযোগগুলো আবার সচল করা হয়। এতে ভৌতকাঠামো নির্মাণ (যেমন-স্থলঘর তৈরি বা মেরামত), আসবাব ও উপকরণ সরবরাহ (যেমন, চেয়ার, টেবিল বা চকবোর্ড) ও ব্যবস্থাপনা পুনঃস্থাপন (যেমন- পাঠদান পরিকল্পনা) দরকার হতে পারে। এই পুনর্বাসন কার্যক্রম সাধারণত মধ্যমেয়াদী হয়ে থাকে।

জনগোষ্ঠীর দুর্দশাঃ

- শারীরিক দুর্দশা- সম্পদ, উপার্জন ও সেবাসমূহ না থাকার কারণে মৌলিক ও জরুরি চাহিদাগুলো মেটাতে পারে না; ফলে ক্ষুধা, পিপাসা, অসুস্থতা, অসুস্থতা ও অপুষ্টিতে কষ্ট পায়।
- মানসিক দুর্দশা- সংকট ও জীবনযাত্রার আকস্মিক পরিবর্তনের কারণে মানসিকভাবে বিপর্যস্ত হয়ে পড়ে; ফলে শোক, সংশয়, উদ্বেগ, ভীতি, হতাশা, বিষাদ ও বিষণ্ণতায় ভোগে।
- সামাজিক দুর্দশা- সম্পদ, জীবিকা ও আশ্রয়হীনতার ফলে দৈনন্দিন দৈন্যদশা, দেনাদায়, জ্ঞান নির্ভরতা, অপরের আশ্রয়ে বসবাস, নিরাপত্তাহীনতা ও মর্যাদাহীন কাজে অংশগ্রহণ স্বীকার করে নিতে হয়।

জনগোষ্ঠীর দুর্দশা নিরসনের জন্য জরুরি মানবিক সহায়তা দরকার হয়। এর মাধ্যমে মৌলিক জরুরি চাহিদা মেটানোর জন্য ভুক্তভোগী ব্যক্তি বা পরিবারের মাঝে সরাসরি সেবা ও সামগ্রী (যেমন-খাবার, পানি ও স্যানিটেশন, চিকিৎসা, শিক্ষা উপকরণ, পোশাক, অস্থায়ী আশ্রয় বা নগদ অর্থ) সরবরাহ করা হয়। চাহিদা নিরূপণের ওপর ভিত্তি করে জরুরি মানবিক সহায়তা দানে পরিকল্পনা করা হয়ে থাকে এবং আপদ ঘটার পর যত তাড়াতাড়ি সম্ভব সেবা ও সামগ্রী সরবরাহের চেষ্টা করা হয়।

দুর্যোগ সম্পর্কিত পরিভাষাসমূহ

আপদ (Hazard)

আপদ এমন একটি সম্ভাব্য বিষয় যার কারণে মানুষের স্বাভাবিক কর্মকাণ্ড ব্যাহত হতে পারে, জীবন ও সম্পদের ক্ষয়ক্ষতি হতে পারে এবং আর্থ-সামাজিক ও কৃষি পরিবেশের ওপর বিরূপ প্রভাব পড়তে পারে।

বিপদ বা আপদ এমন একটি ঘটনা যার দ্বারা জীবন, সম্পদ ও পরিবেশের ক্ষয়ক্ষতি হতে পারে। ইহা প্রাকৃতিক বা মানবসৃষ্ট কারিগরি ত্রুটির কারণে ঘটতে পারে। আপদ কোন দুর্যোগ নয়, ইহা দুর্যোগের সম্ভাব্য কারণ। অন্য কথায় বলা যেতে পারে, সকল আপদই দুর্যোগ নয় কিন্তু সকল দুর্যোগই আপদ। একে আমরা অনেক সময় বিপদ বলে থাকি। উদারণ স্বরূপ ঘূর্ণিঝড় একটি আপদ, এই আপদ তখনই দুর্যোগ হিসাবে পরিগণিত হয় যখন এর আঘাতে প্রাণহানি সহ ঘরবাড়ি, ফসল, পরিবেশ ইত্যাদি ধ্বংসের সম্মুখীন হয়।

ঝুঁকি (Risk)

কোন বৃহৎ জনগোষ্ঠীর আয়, সম্পদ ও পরিবেশের পারস্পরিক নেতিবাচক প্রভাবের কারণে ক্ষতি সাধন হতে পারে। তাই ঝুঁকি স্থান, কাল, পাত্র ভেদে কম-বেশি হতে পারে।

কোন আপদ বা আপদসমূহে, বিপদাপন্ন জনগোষ্ঠী এবং তার আয়, সম্পদ ও পরিবেশ এই তিন উপাদানের মিথস্ক্রিয়ার কারণে ক্ষতিকর প্রভাবের আশঙ্কাই হলো ঝুঁকি। অর্থাৎ সহজে বললে কোন আপদ ঘটার আশঙ্কা ও মাত্রা এবং তার ফলে নির্দিষ্ট জনগোষ্ঠীর ক্ষতির আশঙ্কা এই দুইয়ের পারস্পরিকতাই ঝুঁকি।

$$\text{ঝুঁকি} = \frac{\text{আপদ} \times \text{বিপদাপন্নতা}}{\text{সক্ষমতা}}$$

বিপদাপন্নতা (Vulnerability):

কোন এক বা একাধিক সুনির্দিষ্ট আপদে আক্রান্ত হওয়ার আশংকা যা ব্যক্তি, পরিবার কিংবা জনগোষ্ঠীর ও সমাজ জীবনের বিভিন্ন ক্ষেত্রে বিভিন্ন ক্ষতি সাধন করতে পারে। অর্থাৎ কোন নির্দিষ্ট আপদের মাত্রা ও তা মোকাবেলার ক্ষমতার অনুপাতকে বুঝায়।

$$\text{বিপদাপন্নতা} = \frac{\text{ক্ষতির আশংকা}}{\text{সামর্থ্য}}$$

বিপদাপন্নতা হলো কোন জনগোষ্ঠীর (community) বা তার অংশের (ব্যক্তি বা পরিবার) কোন এক বা একাধিক সুনির্দিষ্ট আপদে আক্রান্ত হওয়ার আশঙ্কা এবং আপদ সংঘটনের ফলে সমাজ জীবন যাপনের বিভিন্ন ক্ষেত্রে ক্ষয় ক্ষতির সম্ভাব্য মাত্রা। বিপন্নতা বলতে কোন ব্যক্তি, পরিবার কিংবা জনগোষ্ঠীর কোন এক বা একাধিক সুনির্দিষ্ট আপদে আক্রান্ত হওয়ার আশংকা এবং ঐ আপদ সংঘটনের ফলে ব্যক্তি, পরিবার ও সমাজ জীবনের বিভিন্ন ক্ষেত্রে ক্ষয়ক্ষতির সম্ভাব্য মাত্রাকে বুঝায়। যেমন- একটি বাঘ 'ক' নামক ব্যক্তির খুব কাছে এবং 'খ' নামক ব্যক্তির বেশ দূরে। এখানে 'ক' নামক ব্যক্তিটি তুলানামূলকভাবে 'খ' ব্যক্তির চেয়ে বেশি বিপন্ন (Vulnerable)। একটি দুর্যোগে একটি সমাজ বা একজন ব্যক্তি কতটুকু বিপদাপন্ন তা নির্ভর করে সেই সমাজের বা ব্যক্তির ঝুঁকি এবং সক্ষমতার মাত্রার ওপর।

সক্ষমতা (Capacity):

দুর্যোগ আক্রান্ত ব্যক্তি, পরিবার বা জনগোষ্ঠীর দুর্যোগ মোকাবেলা করার যোগ্যতা বা সামর্থ্যকে সক্ষমতা বলে।

প্রশমন (Mitigation):

- কাঠামোগত প্রশমন:
এই ব্যবস্থার অংশ হিসাবে ঘূর্ণিঝড় আশ্রয়কেন্দ্র, বন্যা আশ্রয়কেন্দ্র, বেড়িবাঁধ এবং পানি নিষ্কাশনের জন্য দিঘি/ নালা তৈরি করা হয়।
- অকাঠামোগত প্রশমন:
দুর্যোগ ব্যবস্থাপনা সংক্রান্ত আইন, নীতিমালা ও পরিকল্পনা প্রণয়নকে অকাঠামোগত প্রশমন ব্যবস্থার অংশ হিসেবে গুরুত্ব দেয়া হয়।

সারণি: দুর্যোগ ব্যবস্থাপনার সঙ্গে সম্পর্কিত জাতীয় আইন ও নীতিমালা*

নীতি দলিল	বিস্তারিত
দুর্যোগ ব্যবস্থাপনা আইন, ২০১২	ঘাত-সহনশীল অবকাঠামো নির্মাণে নিয়ম-নীতি প্রণয়নে দুর্যোগ ব্যবস্থাপনা কর্মকাণ্ড সমন্বিত, উদ্দেশ্যনির্ভর ও জোরালো করার লক্ষ্য নির্ধারণ করে।
উপকূলীয় অঞ্চল নীতি, ২০০৫	উপকূলবর্তী অঞ্চলে বাস্তুতন্ত্র ও জীববৈচিত্র্য সংরক্ষণের গুরুত্ব উপলব্ধি করে এবং টেকসই জীবিকা নির্বাহ ব্যবস্থা সৃষ্টিতে উপকূলীয় মানুষকে সহায়তা করে।
দুর্যোগ ব্যবস্থাপনার জন্য জাতীয় পরিকল্পনা, ২০০৮-২০১৫	সমস্ত উন্নয়ন পরিকল্পনা, কর্মসূচি ও নীতিমালায় ব্যাপকভাবে দুর্যোগ ঝুঁকি প্রশমন (DRR) এবং জলবায়ু পরিবর্তন অভিযোজন (CAA) ব্যবস্থা গ্রহণের আহ্বান জানানো হয়েছে। তা করা হবে যোগাযোগের সুবিধা ও জরুরি প্রতিক্রিয়া জোরদার করা এবং জলবায়ু পরিবর্তনজনিত ঝুঁকি মূল্যায়ন, সম্প্রদায়ভিত্তিক কর্মসূচির ওপর জোর দেয়া, জনসচেতনতা বৃদ্ধি ও প্রারম্ভিক সতর্কতা ব্যবস্থা ইত্যাদির উন্নতির মাধ্যমে।
জাতীয় অভিযোজন কর্মপরিকল্পনা, ২০০৫	এটি অভিযোজন-বিষয়ক কর্মের জন্য ১৫টি অগ্রাধিকার কার্যক্রম চিহ্নিত করে। এর মধ্যে অন্তর্ভুক্ত থাকে সাধারণ সচেতনতা বৃদ্ধি, সক্ষমতা বিনির্মাণ, এবং ঝুঁকিপূর্ণ অঞ্চলে প্রকল্প বাস্তবায়ন। এজন্য বিশেষ গুরুত্ব দেয়া হয় কৃষিক্ষেত্র ও পানিসম্পদকে।
জাতীয় দুর্যোগ ব্যবস্থাপনা নীতি- ২০১৫	এটি দুর্যোগ ঝুঁকি প্রশমন এবং জরুরি ব্যবস্থাপনার বিষয়ে জাতীয় দৃষ্টিভঙ্গি নির্ধারণ করে এবং বাংলাদেশে দুর্যোগ ব্যবস্থাপনার জন্য কৌশলগত কর্মকাঠামো ও জাতীয় মূলনীতিগুলো বর্ণনা করে।
জাতীয় দুর্যোগ ব্যবস্থাপনার জন্য পরিকল্পনা ২০১৬-২০২০	এনপিডিএম (NPDMD) ২০০৮-২০১৫-কে হালনাগাদ করে।
দুর্যোগ বিষয়ক স্থায়ী আদেশাবলি ২০১৯	সকল পর্যায়ের দুর্যোগ ব্যবস্থাপনার বিষয়ে সংশ্লিষ্ট ব্যক্তিদের নিজ নিজ দায়িত্ব সম্পর্কে অনুধাবন এবং সেই অনুযায়ী দায়িত্ব ও কর্তব্য সম্পাদন সম্পর্কে বর্ণনা করে।

* ৮ম পঞ্চবার্ষিক পরিকল্পনা (জুলাই ২০২০-জুন ২০২৫), পৃষ্ঠা-৬৬০।

গণপ্রজাতন্ত্রী বাংলাদেশ সরকারের "দুর্যোগ বিষয়ক স্থায়ী আদেশাবলি ২০১৯"-এ দুর্যোগকালীন মতস্য অধিদপ্তরের নিম্নবর্ণিত কার্যক্রমসমূহ চিহ্নিত করা হয়েছে:

মতস্য অধিদপ্তর

স্বাভাবিক কার্যক্রমের পাশাপাশি মতস্য অধিদপ্তর দুর্যোগ ঝুঁকি হ্রাসে নিম্নলিখিত দায়িত্ব পালন করবে:

ঝুঁকি হ্রাস কার্যক্রম

- মতস্য অধিদপ্তরের উন্নয়ন কর্মপরিকল্পনায় দুর্যোগঝুঁকি অন্তর্ভুক্ত করা এবং বাস্তবায়নের জন্য প্রয়োজনীয় সম্পদের ব্যবস্থা গ্রহণ;
- মতস্য খামারি ও কর্মকর্তাদের জন্য ঝুঁকি নিরূপণ ও ঝুঁকি হ্রাস কার্যক্রম বিষয়ে প্রশিক্ষণ, সচেতনতা ও শিক্ষামূলক কর্মসূচি গ্রহণ;
- কার্যকরভাবে দুর্যোগ পরিস্থিতি মোকাবিলার জন্য সেক্টরভিত্তিক আপদকালীন পরিকল্পনা প্রণয়ন;
- বন্যাকবলিত এলাকায় স্বল্পমেয়াদি সময়ে পুকুরে মতস্য চাষ (স্বল্পমেয়াদি একুয়াকালচার) প্রযুক্তি উদ্ভাবন ও চাষি পর্যায়ে সম্প্রসারণ;
- প্রাকৃতিক জলাশয়ে মাছের উৎপাদন বৃদ্ধির লক্ষ্যে বর্ষা মৌসুম শুরুর পর এক মাস মা মাছ ও পোনা মাছ ধরা নিষিদ্ধ করার বিষয়টি বিবেচনা করা যেতে পারে, এতে প্রাকৃতিক মাছের উৎপাদন বাড়বে।

জরুরি সাড়াদান

(১) সাড়াদান প্রস্তুতি পর্যায়

- ক) বন্যা, ঘূর্ণিঝড় মৌসুম শুরু হওয়ার আগেই মৎস্য খামার, মাছ চাষের জন্য খাদ্যদ্রব্য, রাসায়নিক দ্রব্যাদি, সরঞ্জামাদি, জল ও স্থলযানসহ দপ্তরের নিজস্ব সম্পদের নিরাপত্তার জন্য প্রয়োজনীয় সতর্কতামূলক ব্যবস্থা গ্রহণ;
- খ) ফিশিং লাইসেন্স প্রদানের আগে প্রতিটি ট্রলারে অয়্যারলেস, রেডিও সেট, বয়া ও লাইফ জ্যাকেট এবং মাছ ধরার নৌকাগুলোতে সামুদ্রিক মৎস্য অফিসের নিবন্ধন আছে কি না, তা যাচাই করা;
- গ) বঙ্গোপসাগরে মাছ শিকাররত সকল মাছ ধরার নৌকা/ট্রলারে রেডিও রিসিভিং সেট ও উক্ত যানে উপস্থিত সকল ব্যক্তির জন্য বয়া, লাইফ জ্যাকেট বহন নিশ্চিতকরণের লক্ষ্যে উপযুক্ত আইনগত ও প্রশাসনিক এবং সহায়তামূলক পদক্ষেপ গ্রহণ;
- ঘ) ঘূর্ণিঝড়/জলোচ্ছ্বাস এবং বন্যাপ্রবণ এলাকাগুলোর সরকারি ও বেসরকারি মৎস্য খামারের তালিকা তৈরি ও সংরক্ষণ করা এবং নির্দিষ্ট সময় পরপর তা হালনাগাদ করা;
- ঙ) ঘূর্ণিঝড় ও বন্যাপ্রবণ এলাকাগুলোর মৎস্যজীবীসংখ্যা জরিপ করে উপজেলাভিত্তিক তালিকা তৈরি ও নির্দিষ্ট সময় পরপর তালিকা হালনাগাদ করা;
- চ) উদ্ধারকারী জাহাজ হিসেবে ব্যবহারের উপযোগী সমুদ্রগামী মাছ ধরার জাহাজগুলোর একটি তালিকা (মালিকের ঠিকানা ও মোবাইল নম্বরসহ) তৈরি ও সংরক্ষণ করা;
- ছ) সামুদ্রিক জলোচ্ছ্বাসে লবণাক্ত পানি এবং বন্যার সময় পানি প্রবেশ রোধে বাংলাদেশ পানি উন্নয়ন বোর্ডের সঙ্গে আলোচনাক্রমে উঁচু ও যথেষ্ট শক্তিশালী বাঁধ ও সুইসগেট নির্মাণ নিশ্চিতকরণ;
- জ) উপকূলীয় পুকুরগুলো থেকে লবণাক্ত পানি বের করে দেওয়ার কাজে শক্তিশালিত পাম্পের সরবরাহ করতে বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশনের সঙ্গে সমন্বয়সাধন;
- ঝ) মাঠ পর্যায়ের কর্মকর্তা, কর্মী এবং মৎস্যজীবী সম্প্রদায়কে ঘূর্ণিঝড় ও বন্যা ঝুঁকি মোকাবিলা প্রস্তুতি, ক্ষয়ক্ষতি এবং পুনর্বাসন বিষয়ে প্রশিক্ষণের ব্যবস্থা গ্রহণ।

(২) সতর্কীকরণ/ইশিয়ারি পর্যায়

- ক) আসন্ন দুর্যোগে মৎস্যসম্পদের ক্ষয়ক্ষতি রোধে করণীয় সম্পর্কে খামারিদের পরামর্শ প্রদান।

(৩) দুর্যোগ পর্যায়

- ক) মৎস্যসম্পদ খাতে ক্ষয়ক্ষতি নিরূপণপূর্বক সরকারি ও বেসরকারি খাতের জন্য অবিলম্বে স্বল্প, মধ্য এবং দীর্ঘমেয়াদি মানবিক সহায়তা ও পুনর্বাসন-পরিকল্পনা তৈরি এবং মন্ত্রণালয়ে প্রেরণ;
- খ) উদ্ধার অভিযানের জন্য সমুদ্রগামী জাহাজ অধিগ্রহণে স্থানীয় প্রশাসনকে সহায়তা প্রদান;
- গ) অধিদপ্তরে নিয়ন্ত্রণকক্ষ পরিচালনা করা এবং স্থানীয় দুর্যোগ ব্যবস্থাপনা কমিটিতে যোগাযোগ করে কর্মকর্তা প্রেরণ।

(৪) পুনর্বাসন ও পুনর্গঠন পর্যায়

- ক) সরকারি ও ব্যক্তিমালিকানাধীন পুকুর থেকে লবণাক্ত পানি পাম্প করে বের করার জন্য পাওয়ার পাম্পের সরবরাহের বিষয়ে স্থানীয় প্রশাসন ও বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশনের সঙ্গে সমন্বয়সাধন;
- খ) ক্ষতিগ্রস্ত মৎস্যচাষি ও মৎস্যজীবীদের তালিকা প্রণয়ন;
- গ) সরকারি ও ব্যক্তিমালিকানাধীন উভয় ক্ষেত্রের মৎস্যসম্পদ খাতে পুনর্বাসন-পরিকল্পনা বাস্তবায়ন করা;
- ঘ) ক্ষতিগ্রস্ত মৎস্যজীবী ও মাছচাষিদের জন্য ঋণসহায়তা এবং অনুদান কর্মসূচি গ্রহণ;
- ঙ) ক্ষতিগ্রস্ত পুকুরমালিকদের মাছের পোনা সরবরাহ এবং মাছ চাষে কারিগরি পরামর্শ প্রদান।

মৎস্য অধিদপ্তরের মাঠ পর্যায়ের কার্যালয়

দুর্যোগ মোকাবিলায় মৎস্য অধিদপ্তরের বিভাগীয়, জেলা ও উপজেলার মাঠপর্যায়ের অফিসগুলো নিম্নলিখিত দায়িত্ব পালন করবে:

ঝুঁকি হ্রাস কার্যক্রম

- ক) স্থানীয় পর্যায়ে মৎস্যখাতের ঝুঁকিগুলো চিহ্নিত করা এবং ঝুঁকি হ্রাস কর্মপরিকল্পনা প্রস্তুত করা;
- খ) বার্ষিক উন্নয়ন কর্মসূচি বাজেটের অধীন বরাদ্দের ব্যবহার করে ঝুঁকি হ্রাস কর্মপরিকল্পনা বাস্তবায়ন করা;
- গ) ঝুঁকিপূর্ণ অঞ্চলের মৎস্যসম্পদ খাতের পরিসংখ্যান ও ডাটাবেজ প্রস্তুত ও রক্ষণাবেক্ষণ করা;
- ঘ) ক্ষুদ্র ও মাঝারি খামারিদের জন্য ঝুঁকি নিরূপণ ও ঝুঁকি হ্রাস কার্যক্রম বিষয়ে প্রশিক্ষণ, সচেতনতা ও শিক্ষা কর্মসূচি গ্রহণ;
- ঙ) দুর্যোগ ব্যবস্থাপনা ও ঝুঁকি হ্রাস কার্যক্রমের জন্য স্থানীয় পর্যায়ে আপদকালীন পরিকল্পনা প্রস্তুত করা এবং বাস্তবায়নের জন্য প্রয়োজনীয় বরাদ্দ প্রাপ্তি নিশ্চিতকরণ;
- চ) ঘূর্ণিঝড় মোকাবিলা প্রস্তুতি ও ক্ষয়ক্ষতি নিরূপণ এবং পুনর্বাসন সম্পর্কে কর্মকর্তা/কর্মচারীদের প্রশিক্ষণ প্রদান।

জরুরি সাড়াদান

(১) সাড়াদান প্রকৃতি পর্যায়

- ক) ঘূর্ণিঝড়/বন্যা মৌসুম শুরু হওয়ার আগেই মাছ ধরার নৌকা, ট্রলার, ফিশিং গিয়ার, মাছের পোনা ও হ্যাচারি এবং মাছ চাষের পুকুরগুলোর নিরাপত্তা ও সুরক্ষার উদ্দেশ্যে প্রয়োজনীয় সতর্কীকরণমূলক ব্যবস্থা গ্রহণের জন্য মৎস্য অধিদপ্তরের মাঠ কর্মকর্তাদের মাধ্যমে কৃষক ও মাছচাষীদের সচেতন করা;
- খ) অধীনস্থ অফিসগুলো, সিপিপি, মাছচাষি এবং জেলে প্রতিনিধি ও সংশ্লিষ্ট অন্যান্য অংশীজনের সঙ্গে সমন্বয় করে অধিদপ্তরের গৃহীত নিয়ন্ত্রণ পরিকল্পনা অনুসারে প্রকৃতি গ্রহণ;
- গ) দুর্যোগকালীন মাছ ধরার নৌকা, ট্রলার, ও ফিশিং গিয়ারগুলো নিরাপদ স্থানে রাখার জন্য প্রয়োজনীয় পদক্ষেপ গ্রহণ;
- ঘ) ফিশিং লাইসেন্স দেওয়ার আগে প্রতিটি ট্রলারে অয়ারলেস ও রেডিও সেট থাকার বিষয় নিশ্চিতকরণ;
- ঙ) উপযুক্ত প্রশাসনিক পদক্ষেপের মাধ্যমে বঙ্গোপসাগরে মাছ ধরার নৌকা/ট্রলারগুলোয় কার্যকর রেডিও রিসিভিং সেট ও ট্রলার, বয়া, নৌকায় উপস্থিত প্রত্যেক ব্যক্তির জন্য লাইফ জ্যাকেট রাখা নিশ্চিতকরণ;
- চ) দুর্যোগপ্রবণ এলাকাগুলোর সরকারি ও বেসরকারি মৎস্য-বিষয়ক সম্পদের নবায়নকৃত তালিকা তৈরি ও সংরক্ষণ করা;
- ছ) দুর্যোগপ্রবণ এলাকাগুলোর মৎস্যজীবী জনসংখ্যা, মাছচাষি ও মাছ চাষের ক্ষেত্রগুলোর জরিপ ও উপাত্ত সংরক্ষণ করা এবং নির্দিষ্ট সময় অন্তর তা হালনাগাদ করা;
- জ) সংশ্লিষ্ট এলাকায় মাছ ধরার নৌকা, ট্রলার এবং সমুদ্রগামী জাহাজগুলোর মালিক/চালকের ঠিকানা ও মোবাইল নম্বরসহ তালিকা সংরক্ষণ করা;
- ঝ) সামুদ্রিক জলোচ্ছ্বাসজনিত কারণে লবণাক্ত পানির প্রবেশ রোধ করার জন্য সংশ্লিষ্ট এলাকার বাঁধ ও সুইসগেটগুলোর পরিচালনা ও রক্ষণাবেক্ষণ নিশ্চিতকরণের উদ্দেশ্যে বাংলাদেশ পানি উন্নয়ন বোর্ডের কর্মকর্তাদের সঙ্গে সার্বক্ষণিক যোগাযোগ করা;
- ঞ) বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশনের সহায়তায় পুকুরগুলো থেকে লবণাক্ত পানি বের করতে শক্তিশালিত নলকূপ সরবরাহ করা।

(২) সতর্কীকরণ/ইশিয়ারি পর্যায়

- ক) আসন্ন দুর্যোগে মৎস্যসম্পদের ক্ষয়ক্ষতি রোধে খামারিদের করণীয় সম্পর্কে ব্যাপক প্রচার ও সহায়তা প্রদান।

(৩) দুর্যোগ পর্যায়

- ক) মানবিক সহায়তা ও পুনর্বাসনকাজ এবং উদ্ধার অভিযানের জন্য সমুদ্রগামী জাহাজ অধিগ্রহণে স্থানীয় প্রশাসনকে সহায়তা প্রদান (ঘূর্ণিঝড় দুর্যোগকালীন);
- খ) সরকারি ও বেসরকারি মৎস্য খামারের অবস্থা পর্যবেক্ষণ করা এবং সার্বিক অবস্থা বিষয়ে অধিদপ্তরকে জানানো;
- গ) নিয়ন্ত্রণকক্ষ চালু করা এবং স্থানীয় দুর্যোগ ব্যবস্থাপনা কমিটিতে যোগাযোগ করে কর্মকর্তা প্রেরণ।

(৪) পুনর্বাসন ও পুনর্গঠন পর্যায়

- ক) সরকারি ও ব্যক্তিমালিকানাধীন মৎস্যসম্পদ খাতে ক্ষয়ক্ষতির নিরূপণ করা এবং এ খাতের জন্য স্বল্প, মধ্য এবং দীর্ঘমেয়াদি মানবিক সহায়তা ও পুনর্বাসন-পরিকল্পনা প্রণয়ন ও তা যথাযথ কর্তৃপক্ষের কাছে প্রেরণ;
- খ) মৎস্য উন্নয়ন খাতে অবিলম্বে মানবিক সহায়তা ও পুনর্বাসন-পরিকল্পনা বাস্তবায়ন নিশ্চিতকরণ এবং কাজের অগ্রগতির বিষয়ে উর্ধ্বতন কর্তৃপক্ষের কাছে প্রতিবেদন পেশ করা;
- গ) ক্ষতিগ্রস্ত পুকুরে মাছচাষিদের পুনর্বাসনের জন্য সহায়তা প্রদান এবং জেলে/মাছচাষিদের জন্য মাছ চাষে ঝুঁপের ব্যবস্থা গ্রহণ;
- ঘ) স্থানীয় প্রশাসনকে মানবিক সহায়তা ও পুনর্বাসনকাজে সহায়তা প্রদান।

ছোট দলীয় অনুশীলন

দলীয় কাজ

উপকূলীয় এলাকায় স্থানীয় দুর্ঘটনা ও দুর্ঘটনার ঝুঁকিসমূহ শনাক্তকরণ ও দুর্ঘটনা ঝুঁকি হ্রাসে ব্যবস্থাপনা

উদ্দেশ্য:

এ অনুশীলনের মাধ্যমে প্রশিক্ষণার্থীরা অর্জিত জ্ঞান ও দক্ষতা স্থানীয় দুর্ঘটনা ও দুর্ঘটনার ঝুঁকি সমূহ শনাক্তকরণ ও দুর্ঘটনা ঝুঁকি হ্রাসে করণীয় নির্ধারণ করতে পারবেন।

কাজের নির্দেশনা:

১. আনন্দদায়ক কোন পদ্ধতিতে অংশগ্রহণকারীদের ৪টি দলে ভাগ করুন।
২. প্রত্যেক দলকে প্রয়োজনীয় সংখ্যক মার্কার ও পোস্টার পেপার/ফ্লিপচার্ট সরবরাহ করুন।
৩. প্রত্যেক দলকে আলাদা আলাদা বসার ব্যবস্থা করুন এবং দলীয় কাজ সম্পর্কে ধারণা দিন।
৪. দলীয় সদস্যগণ নিজেদের মাঝে আলোচনা সাপেক্ষে নিচের ছক অনুযায়ী বিষয়গুলো চিহ্নিত করবেন এবং নোট প্যাডে লিখবেন।
৫. নোট প্যাডে লেখা বিষয়গুলো সকলের মতামত অনুযায়ী পোস্টার পেপারে লিখুন।
৬. সকল দলের পোস্টার পেপারে লেখা শেষে সব প্রশিক্ষণার্থী পূর্বের আসন ব্যবস্থায় বসুন।
৭. দল নেতা পোস্টার পেপারে লেখা বিষয়গুলো সকলের সামনে উপস্থাপন ও আলোচনা করুন।
৮. পরবর্তীতে সহায়ক সকল দলের প্রাপ্ত তথ্য সংকলিত করে হ্যান্ডআউট আকারে সকল অংশগ্রহণকারীকে সরবরাহ করুন এবং প্রশিক্ষণ ম্যানুয়ালের এ অংশে সংযুক্ত করে রাখুন।

প্রধান দুর্ঘটনাসমূহ	ঝুঁকিসমূহ	ঝুঁকি হ্রাসে ব্যবস্থাপনা

সময়: ২০ মিনিট

পাওয়ারপয়েন্ট উপস্থাপন পরিকল্পনা

বিশেষ দ্রষ্টব্য: পাওয়ার পয়েন্ট উপস্থাপন পরিকল্পনার ছকটি নমুনা মাত্র। প্রশিক্ষক বা সহায়ক নীচের ছকে দেয়া মূল বিষয়ের আলোকে নিজের মত করে পরিপূর্ণ পাওয়ার পয়েন্ট উপস্থাপনা তৈরি করে নেবেন।

পৃষ্ঠা-১	পৃষ্ঠা-২
দুর্যোগ সম্পর্কে মৌলিক ধারণা ও পরিভাষাসমূহ	দুর্যোগের কারণ ও ফলাফল
পৃষ্ঠা-৩	পৃষ্ঠা-৪
দুর্যোগ সম্পর্কিত পরিভাষাসমূহ	দুর্যোগ প্রশমন (Mitigation)
পৃষ্ঠা-৫	পৃষ্ঠা-৬
দুর্যোগ ব্যবস্থাপনার সঙ্গে সম্পর্কিত জাতীয় আইন ও নীতিমালা	“দুর্যোগ বিষয়ক স্থায়ী আদেশাবলি ২০১৯”- অনুযায়ী দুর্যোগকালীন মত্স্য অধিদপ্তরের করণীয় কার্যক্রমসমূহ

অধিবেশন পরিকল্পনা

দিন: ০৬	অধিবেশন: ৬.৫	সময়: ১২.০০-১৩.০০	মেয়াদ: ৬০ মিনিট
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অভীষ্ট দল: মৎস্য অধিদপ্তরের কর্মকর্তাবৃন্দ

শিরোনাম: জেভার সচেতনতা এবং শুদ্ধাচার

লক্ষ্য: অংশগ্রহণকারীদের শুদ্ধাচার কৌশল এবং জেভার সচেতনতা এর সার্বিক বিষয়াদি সম্পর্কে জ্ঞান ও দক্ষতার উন্নয়ন করা হবে যাতে তাঁরা কার্যকরভাবে শুদ্ধাচার চর্চা এবং জেভার বৈষম্য নিরসনে ভূমিকা রাখতে পারেন।

উদ্দেশ্য: অধিবেশন শেষে অংশগ্রহণকারীগণ-

- জেভার এর মৌলিক ধারণা সম্পর্কে বলতে পারবেন;
- জেভার সম্পর্ক, সমতা ও ন্যায্যতা সম্পর্কে বলতে পারবেন।
- শুদ্ধাচারের সাধারণ ও সাংবিধানিক ধারণা সম্পর্কে বলতে পারবেন;
- প্রতিষ্ঠানে শুদ্ধাচারের গুরুত্ব, প্রভাবকসমূহ, ভিত্তি ও বিবেচ্য বিষয়সমূহ সম্পর্কে বলতে পারবেন; এবং
- মৎস্য অধিদপ্তরে শুদ্ধাচার কৌশল বাস্তবায়ন প্রক্রিয়া সম্পর্কে বলতে পারবেন।

অধিবেশনের আলোচ্য বিষয়		প্রশিক্ষণ কৌশল	সময়
ভূমিকা			০৪ মিনিট
১. পূর্ববর্তী অধিবেশন "জরিপ কাজে চ্যালেঞ্জসমূহ ও উত্তরণ পরিকল্পনা" এর সূত্র ধরে এ অধিবেশনের আলোকপাত ও অংশগ্রহণকারীদের স্বাগত জানানো। ২. বর্তমান অধিবেশনের আলোকপাত ও উদ্দেশ্যের ব্যাখ্যা (জ্ঞাত এবং প্রাসঙ্গিক কোন গল্প/ঘটনা/বিষয় বর্ণনার মাধ্যমে এ অধিবেশনের আলোকপাত)। ৩. এ অধিবেশনের কার্যক্রম, কৌশল ও সময় সম্পর্কে জানানো। ৪. উদ্দেশ্য ও গুরুত্বসহ অধিবেশনের মূল বিষয় আলোচনার মাধ্যমে অংশগ্রহণকারীদের মাঝে আগ্রহ সৃষ্টি করা।		বক্তৃতা	
বিষয়বস্তু			৫০ মিনিট
১. জেভার সম্পর্কে মৌলিক ধারণা ২. জেভার সম্পর্ক ৩. জেভার সমতা ও ন্যায্যতা ৪. নারী-পুরুষের অবস্থা ও অবস্থান ৫. শুদ্ধাচারের সাধারণ ও সাংবিধানিক ধারণা। ৬. প্রতিষ্ঠানে শুদ্ধাচারের গুরুত্ব, প্রভাবকসমূহ, ভিত্তি ও বিবেচ্য বিষয়সমূহ। ৭. মৎস্য অধিদপ্তরে জাতীয় শুদ্ধাচার কৌশল বাস্তবায়ন প্রক্রিয়া		বক্তৃতা ও প্রশ্নোত্তর	
সার-সংক্ষেপ			০৬ মিনিট
প্রশ্নোত্তরের মাধ্যমে এ অধিবেশনের মূল শিক্ষণীয় বিষয়সমূহের বোধগম্যতা যাচাই করুন। সকলেই হ্যান্ডআউট পেয়েছেন কি না তা যাচাই করুন। অধিবেশনে আলোচ্য বিষয়ের সারসংক্ষেপ করে পরবর্তী অধিবেশন "কোর্স পুনরালোচনা, কোর্স মূল্যায়ন ও প্রশিক্ষণ পরবর্তী মূল্যায়ন এবং সমাপনী" এর ওপর আলোকপাত করুন এবং সকলকে ধন্যবাদ জানিয়ে অধিবেশন শেষ করুন।		বক্তৃতা	
সহায়ক সামগ্রী		বোর্ড, মার্কার, মাল্টিমিডিয়া এবং হ্যান্ডআউট ইত্যাদি	
প্রশিক্ষক বা সহায়কের প্রতি বিশেষ নির্দেশনা: বিষয়বস্তু অংশে প্রশিক্ষক বা সহায়ক শিক্ষণীয় বিষয়বস্তুর আলোকে কী, কেন, কোথায়, কখন, কার দ্বারা, কিভাবে ও সতর্কতা, বিশেষ বক্তব্য বা নির্দেশনা গুরুত্বসহ উপস্থাপন করবেন।			

জেন্ডার সচেতনতা এবং শুদ্ধাচার

১. জেন্ডার (Gender) বিষয়ক মৌলিক ধারণা

১.১ জেন্ডার (Gender) ও সেক্স (Sex)

জেন্ডার (Gender) শব্দটির আভিধানিক অর্থ লিঙ্গ (Sex)। সাধারণত ব্যাকরণেও জেন্ডার শব্দটি ব্যবহৃত হয় 'নারী অথবা পুরুষ' লিঙ্গ (Sex) চিহ্নিত করার জন্য। যেমন: পুংলিঙ্গ, স্ত্রী লিঙ্গ, ক্লীব লিঙ্গ, উভলিঙ্গ ইত্যাদি। কিন্তু এভাবে জেন্ডার এবং সেক্স বা লিঙ্গ একই অর্থে ব্যবহৃত হয়ে এলেও সাম্প্রতিককালে উন্নয়ন সাহিত্য ও কর্মে জেন্ডার ভিন্ন এবং ব্যাপকতর অর্থে ব্যবহৃত হচ্ছে। উন্নয়ন কর্মকাণ্ডে তাই আজ জেন্ডার এবং সেক্সের মধ্যে সুনির্দিষ্ট পার্থক্য টানা হয়েছে।

সেক্স শব্দটির জৈবিক বা শারীরিক (Biological) প্রকাশ থেকে ভিন্নতর প্রেক্ষিত তুলে ধরার জন্য জেন্ডার শব্দটি প্রথম মনোবিজ্ঞানী এবং তারপর নারীবাদীদের দ্বারা ব্যবহৃত হতে শুরু করে। জেন্ডার একজন নারী বা পুরুষ হিসেবে আমাদের সামাজিক পরিচয় যা প্রাকৃতিকভাবে নির্বাচিত শারীরিক বৈশিষ্ট্যের বদলে সামাজিকভাবে সৃষ্ট, সেই সত্যটিকে প্রকাশ করে।

সেক্স হচ্ছে প্রাকৃতিক বা জৈবিক কারণে সৃষ্ট নারী-পুরুষের বৈশিষ্ট্যসূচক ভিন্নতা বা শারীরিক বৈশিষ্ট্যের ভিত্তিতে নারী-পুরুষের স্বাতন্ত্র্য কিংবা শারীরবৃত্তীয়ভাবে নির্ধারিত নারী-পুরুষের বৈশিষ্ট্য, যা অপরিবর্তনীয়। সেক্স শারীরিক বৈশিষ্ট্য সূচিত।

আর জেন্ডার হচ্ছে সামাজিকভাবে গড়ে উঠা নারী-পুরুষের পরিচয়, সামাজিকভাবে নির্ধারিত নারী-পুরুষের মধ্যকার সম্পর্ক, সমাজ কর্তৃক নির্ধারিত নারী-পুরুষের ভূমিকা, যা পরিবর্তনযোগ্য। জেন্ডার বৈশিষ্ট্য একটি নির্দিষ্ট সমাজে সামাজিক ও মনস্তাত্ত্বিকভাবে নির্ধারিত। এ্যান ওকলে (Anne Oakley) প্রথমে সুনির্দিষ্টভাবে সেক্স ও জেন্ডার এর মধ্যে এসব মৌলিক ধারণাগত পার্থক্য তুলে ধরেন।

জেন্ডার তাই সমাজে একজন নারী বা একজন পুরুষ কি রকম, সে ধারণা প্রদান করে। নারী ও পুরুষের কার কি রকম পোষাক পরিচ্ছদ হবে, কে কি রকম আচার-আচরণ করবে, আশা-আকাঙ্ক্ষা, প্রত্যাশা কার কি রকম হবে তা প্রকাশ করে জেন্ডার। এছাড়াও জেন্ডার সমাজে একজন নারী বা একজন পুরুষের ভূমিকা কি তাও নির্ধারণ করে। যেমন: রান্না-বান্না, সন্তান লালন-পালন সহ ঘরের কাজ হলো নারীর কাজ, আর আয়-উপার্জন, বিচার, সালিশ রাজনীতি ইত্যাদি বাইরের কাজ হলো পুরুষের। কিন্তু এসব বিষয়গুলো দেশ বা সংস্কৃতি ভেদে যে ভিন্ন ভিন্ন হয় তা ইউরোপীয় নারী ও পুরুষ এবং বাংলাদেশী নারী ও পুরুষের মধ্যে তুলনা করলেই স্পষ্ট হয়ে উঠে। মোট কথায় লিঙ্গ বা সেক্স হলো প্রাকৃতিক বা শারীরিকভাবে নির্ধারিত নারী-পুরুষের ভিন্নতা আর জেন্ডার হচ্ছে সামাজিকভাবে সৃষ্ট নারী-পুরুষের সম্পর্ক। বস্তুতঃ নারী ও পুরুষ এই বিপরীত লিঙ্গের মধ্যকার সম্পর্কের সামাজিক সংগঠনকে নির্দেশ করে জেন্ডার। অন্য কথায় সমাজে নারী ও পুরুষের অবস্থানের গুণগত ও পরস্পর নির্ভরশীল চরিত্রকে প্রকাশ করে জেন্ডার। জেন্ডার হলো লিঙ্গ বা সেক্সে সামাজিক গঠন। সমাজে পুরুষ ও নারীর সামাজিকভাবে প্রত্যাশিত আচরণ-বা শারীরিক বা লিঙ্গীয় বৈশিষ্ট্যের ওপর নির্ভরশীল নয় তা হলো জেন্ডার।

সেক্স	জেন্ডার
শারীরিক/জৈবিক	সামাজিক, সাংস্কৃতিক ও মনস্তাত্ত্বিক
সার্বজনীন	সমাজ সংস্কৃতি ভেদে ভিন্ন
অপরিবর্তনীয়	পরিবর্তনযোগ্য
প্রাকৃতিকভাবে সৃষ্ট	সমাজ-সংস্কৃতি থেকে গৃহীত

জেন্ডার সম্পর্ক সংস্কৃতি, জাতি, ধর্ম, শ্রেণিভেদে বিভিন্ন সমাজে ভিন্ন ভিন্ন রকম হলেও গোটা বিশ্বজুড়ে দু'টি গুরুত্বপূর্ণ ক্ষেত্রে সাধারণত: অভিন্ন অবস্থা বিদ্যমান। এগুলো হলো: নারী-পুরুষের দৈনন্দিন কাজ, দায়-দায়িত্ব পালনে ব্যবহৃত সময়ের ক্ষেত্রে ভিন্নতা বা অসমতা অর্থাৎ জেন্ডারভিত্তিক শ্রম বিভাগ। দ্বিতীয়ত পুরুষের তুলনায় সম্পত্তি, অধিকার, পছন্দ, ক্ষমতা, নিয়ন্ত্রণ, সিদ্ধান্ত গ্রহণের ক্ষেত্রে নারীর অধিকারহীনতা বা সুযোগের অভাব অর্থাৎ সমাজে নারীর অমর্যাদাজনক বা অধস্তন অবস্থান।

১.২ আমাদের সমাজে নারী ও পুরুষ সম্পর্কে প্রচলিত ধারণাসমূহ -

নারী	পুরুষ
দুর্বল	শক্তিশালী
কম আত্মবিশ্বাসী	আত্মবিশ্বাসী
সিদ্ধান্ত পালনকারী	সিদ্ধান্ত গ্রহণকারী
লাজুক	জড়তাহীন
কোমল	কঠিন
লম্বা চুল	ছোট চুল
ঘরের কাজ করে	বাইরের কাজ করে
ভীত	সাহসী
নিচু কণ্ঠ	উঁচু কণ্ঠ
পরিবারের বোঝা	সম্পদ
নিয়ন্ত্রিত ইত্যাদি	নিয়ন্ত্রণকারী ইত্যাদি

২. জেন্ডার পরিভাষা (Gender Terminology)

২.১ জেন্ডারড (Gendered)

সমাজ বা সংস্কৃতি যেসব উপকরণের মাধ্যমে নারী-পুরুষকে বিভক্ত বা পার্থক্য করে তা জেন্ডারড। পার্থক্য করণের ক্ষেত্রসমূহ হলো-

- পোশাক
- জুতা
- রীতিনীতি
- সাজসজ্জা
- চাকুরি/পেশা
- খেলনা
- অলংকার, ইত্যাদি।

২.২ জেন্ডার সচেতনতা (Gender-awareness)

নারী ও পুরুষের ক্ষেত্রে জেন্ডার বৈষম্য সৃষ্টিকারী আর্থ-সামাজিক ও সাংস্কৃতিক কারণগুলো উপলব্ধি ও বিবেচনা করাই জেন্ডার সচেতনতা।

২.৩ জেন্ডার-সংবেদনশীলতা (Gender-sensitivity)

নারী-পুরুষের সামাজিক, সাংস্কৃতিক, দৃষ্টিভঙ্গি এবং মানবসৃষ্ট অন্যান্য যে পার্থক্যগুলো (নারী ও পুরুষের চাহিদা, ভূমিকা, দায়িত্ব, অধিত্ব এবং পরিচয় সংক্রান্ত) রয়েছে সে বিষয়ে সচেতন হওয়া এবং প্রতিক্রিয়া ব্যক্ত করাকে জেন্ডার সংবেদনশীলতা বলে। আরো বলা যায়, জেন্ডার সংবেদনশীলতার অর্থ হলো সমাজের যে জটিল বিন্যাসে আমাদের সামাজিকায়ন ঘটে তার ভেতরে সচেতনতা গড়ে তোলার একটি প্রক্রিয়া যার উদ্দেশ্য হলো নারীর কৌশলগত চাহিদা/স্বার্থ (Strategic Need/Interest) অনুযায়ী কাজটি করা। জেন্ডার সচেতনতার জন্য কেবল বুদ্ধিবৃত্তিক প্রচেষ্টা নয় বরং সংবেদনশীলতা ও উন্মুক্ত মানসিকতার প্রয়োজন। জেন্ডার সংবেদনশীলতাকে প্রকৃতপক্ষে জেন্ডার সচেতনতার একটি উচ্চতর ধাপ বলা যেতে পারে, যার মাধ্যমে ইতিবাচক পরিবর্তনের লক্ষ্যে নারী-পুরুষ নির্বিশেষে বৈষম্যকে সচেতনতা সহকারে পর্যবেক্ষণ করে যথাযথ কর্ম-পরিকল্পনাসহ প্রয়োজনীয় পদক্ষেপ গ্রহণ করে।

২.৪ জেন্ডার সমতা (Gender equality)

জেন্ডার সমতা বলতে আমরা বুঝি নারী ও পুরুষের জন্য সমান অধিকার, দায়-দায়িত্ব ও সুযোগ-সুবিধা। জেন্ডার সমতা হলো সামাজিক ও ব্যক্তিগত জীবনের সকল ক্ষেত্রে নারী ও পুরুষ উভয়ের সমান দৃশ্যমানতা, সমান ক্ষমতায়ন ও সমান অংশগ্রহণ। অর্থাৎ জেন্ডার অসমতার ঠিক বিপরীত হলো জেন্ডার সমতা। জেন্ডার সমতা তাই জীবনের সকল ক্ষেত্রে ও সমাজের সকল বিষয়ে নারী ও পুরুষের সমান অধিকার, সমান সুযোগ-সুবিধা, সমান অবস্থা ও অবস্থান, সমান আচার-আচরণ। জেন্ডার সমতা অর্থ একই অধিকার, দায়-দায়িত্ব ও সুযোগ-সুবিধা নয়। কিংবা জেন্ডার সমতা সমান সংখ্যা বা সমান অনুপাতও বুঝায় না। আসলে জেন্ডার সমতা পরিমাণগত ও গুণগত উভয় দিককেই ধারণ করে। এক্ষেত্রে পরিমাণগত দিকটি বস্টন ইস্যুটির সাথে সম্পর্কিত, অন্যদিকে

মূল্যায়ন ইস্যুটি তুলে ধরে গুণগত দিকটি। সমাজ ও রাষ্ট্র তার সকল নাগরিককে যে সকল অধিকার ও সুযোগ প্রদান করেছে তা নারী-পুরুষ সমভাবে ভোগ করতে পারলে জেডার সমতা প্রতিষ্ঠিত হবে। জেডার ভিত্তিক সমাজ ব্যবস্থায় নারীরা পুরুষের তুলনায় সর্বক্ষেত্রে অধস্তন অবস্থায় আছে বিধায় জেডার সমতা আনয়ন অত্যন্ত জরুরি।

২.৫ জেডার সাম্যতা/ন্যায্যতা (Gender equity)

জেডার সাম্যতা বা ন্যায্যতা হলো জেডার সমতায় পৌঁছানোর একটি প্রক্রিয়া। নারী ও পুরুষের শারীরিক পার্থক্য বিবেচনার বাইরে তাদের সমতা অর্জনের ক্ষেত্রে মূল্যবোধ, দৃষ্টিভঙ্গি, প্রচলিত নিয়ম, ধারণা ইত্যাদিকে বিবেচনায় নেয়া অর্থাৎ নারী ও পুরুষের বৈষম্যের ক্ষেত্রে সাংস্কৃতিক বা সামাজিক সীমাবদ্ধতাগুলোকে বিবেচনা করা প্রয়োজন এবং এর ভিত্তিতে অবস্থার পরিবর্তন করার চেষ্টা করা জরুরি। জেডার সাম্যতার মাধ্যমে নারী ও পুরুষ উন্নয়নের সকল ক্ষেত্রে সমানভাবে অংশগ্রহণ করতে পারে এবং সামাজিক-অর্থনৈতিক সম্পদে সমান প্রবেশ ও নিয়ন্ত্রণ লাভ করে। তাই জেডার সাম্যতা বা ন্যায্যতা হলো বিভিন্ন ক্ষেত্রে নারী-পুরুষের মধ্যে বৈষম্য দূর করার প্রচেষ্টা, পদ্ধতি, ব্যবস্থা, সুযোগ সৃষ্টি ইত্যাদি। এর জন্য প্রয়োজন:

- নারী-পুরুষের জন্য সমান অবস্থা সৃষ্টি যেন নারী-পুরুষ উভয়ের ভিতরের সমতা ও প্রত্যাশা পূরণ হয়;
- স্থানীয় সম্পদ, উন্নয়ন উপকরণ, উন্নয়নের সুফললাভের সকল ক্ষেত্রে নারী-পুরুষের সমান অংশগ্রহণ ও সমান দায়িত্ব পালনের সুযোগ;
- মতামত প্রকাশের, চলাচলের ও জীবনের মান উন্নয়নের সমান সুযোগ লাভ;
- জীবনের সকল ক্ষেত্রে সমান সুযোগ লাভ।

জেডার সাম্যতা বা ন্যায্যতা বোঝার জন্য শিয়াল ও সারসের উদাহরণ উল্লেখ করা যেতে পারে। শিয়ালকে খাবার দেয়া হয়েছে লম্বা গলার কলস ধরনের পাত্রে এবং সারসকে খাবার দেয়া হয়েছে চ্যাপ্টা থালা ধরনের পাত্রে। শিয়াল ও সারসকে সমান খাবার দেয়া হয়েছে এবং খাবার গ্রহণের ক্ষেত্রে ও সমান অধিকার দেয়া হয়েছে। কিন্তু তারপরেও শিয়াল আর সারসের খাদ্য গ্রহণে সমতা প্রতিষ্ঠিত হয় না। কেননা, সারসের ঠোঁটের প্রকৃতি অনুযায়ী তার প্রয়োজন লম্বা গলার কলস ধরনের পাত্র এবং শিয়ালের চোয়ালের প্রকৃতি অনুযায়ী তার প্রয়োজন চ্যাপ্টা থালা ধরনের পাত্র। শিয়াল আর সারসের চোয়াল ও ঠোঁটের গঠন অনুযায়ী তাদের পাত্রের চাহিদাও ভিন্ন। এক্ষেত্রে শিয়াল ও সারসের প্রতি সাম্যতা বা ন্যায্যতা তখনই প্রতিষ্ঠিত হবে, যখন শিয়ালের চাহিদা অনুযায়ী চ্যাপ্টা পাত্র আর সারসের চাহিদা অনুযায়ী লম্বা পাত্রে তাদের খাদ্য সরবরাহ করা হবে। একইভাবে জেডার সাম্যতা বা ন্যায্যতা নারী ও পুরুষের সমস্যা ও চাহিদা পৃথক পৃথকভাবে বিবেচনা করে এবং সে অনুযায়ী প্রয়োজনীয় ব্যবস্থা গ্রহণ করা হয়। পরিশেষে বলা যায়, জেডার সাম্যতা হলো জেডারসমতা অর্জনের কার্যকর একটি উপায় বা পন্থা।



চিত্র: সমতা (equality)

সাম্যতা/ন্যায্যতা (equity)

২.৬ নারী-পুরুষের অবস্থা (Condition) ও অবস্থান (Position)

‘অবস্থা’ এবং ‘অবস্থান’ শব্দ দু’টির মধ্যে যদিও সুনির্দিষ্ট পার্থক্য রয়েছে তবুও অনেক ক্ষেত্রেই এ দু’টি শব্দ সম অর্থে ব্যবহৃত হয়ে থাকে। ‘অবস্থা’ মানুষের বস্তুগত চাহিদার সঙ্গে সম্পর্কযুক্ত। যেমন: খাদ্য, পুষ্টি, শিক্ষা, স্বাস্থ্যসেবা, আয়-উপার্জনক্ষমতা, জীবনযাত্রার মান ইত্যাদি। অবস্থার উন্নতির অর্থ হল জীবনযাত্রার মান উন্নয়ন। তাই নারী-পুরুষের অবস্থা বলতে বুঝায় তাদের বস্তুগত অবস্থা; যেমন: খাদ্য, পুষ্টি, শিক্ষা, স্বাস্থ্যসেবা, আয়-উপার্জন ইত্যাদি।

‘অবস্থান’ সরাসরি ক্ষমতা, নিয়ন্ত্রণ, সম্পদ, অধিকার, পছন্দ, সিদ্ধান্ত গ্রহণ এবং মর্যাদা ইত্যাদির সঙ্গে জড়িত। অবস্থান সমাজ বা পরিবারে মানুষের (নারী ও পুরুষ) মর্যাদা, ক্ষমতা অর্জন, সিদ্ধান্ত গ্রহণের স্বাধীনতার সঙ্গে সম্পর্কিত। অতএব নারী বা পুরুষের অবস্থান বলতে তাদের ক্ষমতা অর্জন ও তার ব্যবহার, স্বীয় পছন্দ অনুযায়ী কর্ম-পরিকল্পনা গ্রহণ এবং তার ওপর নিয়ন্ত্রণ বজায় রাখার যে অধিকার বা তা ব্যবহারের যে সুযোগ ও ক্ষমতা তাকে বুঝানো হয়।

নারী-পুরুষের অবস্থা জীবনযাত্রার মান উন্নয়নের সঙ্গে সবসময় সম্পর্কিত নয়। তাই দেখা যায় অবস্থার পরিবর্তন ঘটলে অবস্থানের পরিবর্তন নাও ঘটতে পারে। যেমন অনেক গোড়া, ধনী পরিবারে নারীদের আর্থিক অবস্থা ভাল থাকা সত্ত্বেও গর্ভাবস্থা ঝুঁকিপূর্ণ বিবেচনা না করে বাড়িতেই সন্তান প্রসব করানো হয়। এক্ষেত্রে আর্থিক সঙ্গতি থাকা সত্ত্বেও শুধু সিদ্ধান্ত গ্রহণ ক্ষমতার অভাবে নিরাপদ নয় এমন ব্যবস্থাকে মেনে নিতে হয়। তবে অবস্থা এবং অবস্থান কখনো কখনো পরিপূরক হতেও পারে।

২.৬.১ নারী পুরুষের অবস্থা এবং অবস্থান এর পার্থক্য

অবস্থা (Condition)

	নারী	পুরুষ
পরিবার	- গৃহস্থালী বা সাংসারিক কাজের বোঝা বহন করে; - সন্তান লালন-পালন করে। খাবার তৈরি, পানি ও জ্বালানি সংগ্রহ করে; - খাদ্য, পুষ্টি, শিক্ষা, স্বাস্থ্যসেবা, প্রশিক্ষণ ও অন্যান্য সুযোগ-সুবিধা কম লাভ করে; - আয় উপার্জনের সুযোগ কম; - দীর্ঘ শ্রমদিবসের ধকল সহ্য করে। অবকাশ-অবসর যাপন ও বিনোদনের সুযোগ কম।	- সাধারণত গৃহ-ব্যবস্থাপনা সংক্রান্ত দায়-দায়িত্ব বহন করে না; - প্রধানত আয় উপার্জনের কাজ করে; - খাদ্য, পুষ্টি, শিক্ষা, স্বাস্থ্যসেবা, দক্ষতা, প্রশিক্ষণ ইত্যাদি ক্ষেত্রে বেশি সুযোগ পায়; - অবসরযাপন ও বিনোদনের সুযোগ নারীর তুলনায় অনেক বেশি ভোগ করে।
সমাজ	- সামাজিক কর্মকাণ্ডে অংশগ্রহণ এবং সামাজিক সুবিধাদি ভোগের সুযোগ খুব কম - সভা-সমাবেশ, বিচার-সালিস ও অন্যান্য সামাজিক কর্মকাণ্ডে অংশগ্রহণের সুযোগ নেই বললেই চলে।	- সামাজিক কর্মকাণ্ডে এবং সামাজিক সুবিধাদি ভোগের ক্ষেত্রে নারীর তুলনায় অনেক বেশি সুযোগ লাভ করে - বিচার-সালিস, সভা-সমাবেশসহ সকল সামাজিক কর্মকাণ্ডে অংশগ্রহণের সুযোগ অনেক বেশি।
রাষ্ট্র	- নাগরিক অধিকার ভোগের সুযোগ নেই বললেই চলে - ভোটাধিকার রাষ্ট্রীয়ভাবে স্বীকৃত হলেও তা প্রয়োগ করার ক্ষেত্রে নানান বাধার সম্মুখীন হয় - রাষ্ট্রীয় কর্মকাণ্ডে অংশগ্রহণের সুযোগ কম। - জাতীয় রাজনীতি ও অর্থনীতিতে অবদান রাখার এবং তার সুফল ভোগের সুযোগ খুবই কম - শ্রমশক্তিতে অংশগ্রহণের ক্ষেত্র সীমিত এবং জাতীয় অর্থনীতিতে তা যথাযথভাবে প্রতিফলিত হয় না।	- নাগরিক অধিকার ভোগের সুযোগ অনেক বেশি - অবাধে ভোটাধিকার প্রয়োগ করে - রাষ্ট্রীয় কর্মকাণ্ডে অংশগ্রহণের সুযোগ বেশি - জাতীয় অর্থনীতিতে ও রাজনীতিতে অবদান রাখার সুযোগ অধিক - জাতীয় অর্থনীতিতে মূল শ্রমশক্তিরূপে বিবেচিত হয়।

অবস্থান (Position)

	নারী	পুরুষ
পরিবার	- অর্থ-সম্পদের ওপর অধিকার ও নিয়ন্ত্রণ নেই; - পারিবারিক সিদ্ধান্ত গ্রহণের সুযোগ থেকে বঞ্চিত; - ক্ষমতাহীন ও মর্যাদাহীন; - গৃহ ব্যবস্থাপনা ও পরিচালনায় কাজে তাদের অবদান স্বীকৃত নয় এবং তার যথাযথ মূল্যায়ন নেই; - মতামত প্রদান ও সিদ্ধান্ত গ্রহণের সুযোগ অত্যন্ত সীমিত; - পছন্দ ও অন্যান্য সুযোগ-সুবিধা থেকে বঞ্চিত; - আয়ের ওপর নিয়ন্ত্রণ নেই। অবহেলিত, পরাধীন ও অধঃস্তন অবস্থানে থাকতে হয়।	- অর্থ, সম্পদ নিয়ন্ত্রণ করে; - পরিবারের সিদ্ধান্ত দাতা; - ক্ষমতাবান, স্বাধীন ও মর্যাদাবান। - মতামত ও পছন্দের ক্ষেত্রে বিশেষ সুবিধা ভোগ করে;
সমাজ	- সামাজিক কর্মকাণ্ডে নীতিনির্ধারণ ও সিদ্ধান্ত গ্রহণের ক্ষেত্রে অংশগ্রহণের সুযোগ কম - নানান বৈষম্যের শিকার। - নেতৃত্বে অনুপস্থিত - ধর্মীয় গোড়ামীর শিকার, বৈষম্যের শিকার, ক্ষমতা ও মর্যাদাহীন।	- সামাজিক কর্মকাণ্ড, নীতিনির্ধারণ ও সিদ্ধান্ত গ্রহণের অধিক সুযোগ - নেতৃত্ব দান করে - ক্ষমতাবান, ও মর্যাদাবান।
রাষ্ট্র	- স্থানীয় ও জাতীয় পর্যায়ে নির্বাচনে প্রার্থী হিসাবে প্রতিদ্বন্দ্বিতার সুযোগ কম; - রাষ্ট্রীয় কর্মকাণ্ড, নীতিনির্ধারণ ও সিদ্ধান্তের ক্ষেত্রে অংশ গ্রহণের সুযোগ নেই বললেই চলে; - পেশাগত বৈষম্যের শিকার; - রাজনীতিতে অংশগ্রহণের সুযোগ খুব কম; - আইনগত বৈষম্যের শিকার; - বিবাহ, বিবাহ বিচ্ছেদ, সন্তানের অভিভাবকত্ব অধিকার ও উত্তরাধিকারের ক্ষেত্রে বৈষম্যের শিকার।	- সব ধরনের নির্বাচনে প্রার্থী হিসাবে প্রতিদ্বন্দ্বিতা করার সুযোগ থাকে; - রাষ্ট্রীয় কর্মকাণ্ডে, নীতিনির্ধারণ ও সিদ্ধান্ত গ্রহণের ক্ষেত্রে একচ্ছত্র আধিপত্য; - পেশাগত বৈষম্যের শিকার হয় না; - আইনগত সহায়তা সহজেই পেয়ে থাকে; - রাজনীতিতে অবাধ অংশগ্রহণ।

শুদ্ধাচার

১.১ ভূমিকা

বাংলাদেশ একটি উদীয়মান, প্রগতিশীল, গণতান্ত্রিক, উন্নয়নশীল রাষ্ট্র। এই জাতির লক্ষ্য 'রূপকল্প ২০৪১' বাস্তবে রূপায়ণ-বাংলাদেশের প্রেক্ষিত পরিকল্পনা ২০২১-২০৪১' এর ভিত্তিমূলে রয়েছে দুটি প্রধান অভীষ্ট: (ক) ২০৪১ সালের মধ্যে বাংলাদেশ হবে একটি উন্নত দেশ, যেখানে বর্তমান মূল্যে মাথাপিছু আয় হবে ১২,৫০০ মার্কিন ডলারেরও বেশি এবং যা হবে ডিজিটাল বিশ্বের সাথে সম্পূর্ণ সঙ্গতিপূর্ণ, (খ) বাংলাদেশ হবে সোনার বাংলা, যেখানে দারিদ্র্য হবে সুদূর অতীতের ঘটনা। রূপকল্প ২০৪১ বাস্তবায়নে প্রণীত প্রেক্ষিত পরিকল্পনা ২০৪১-এর সুফলভোগী হবে জনগণ এবং এরাই হবে প্রবৃদ্ধি ও রূপান্তর প্রক্রিয়ার প্রধান চালিকাশক্তি। এ পরিকল্পনার চারটি প্রাতিষ্ঠানিক স্তরের প্রথমটিই হচ্ছে 'সুশাসন'। গণপ্রজাতন্ত্রী বাংলাদেশের সংবিধানের প্রস্তাবনা অনুযায়ী গণতান্ত্রিক পদ্ধতিতে 'এমন এক শোষণমুক্ত সমাজতান্ত্রিক সমাজের প্রতিষ্ঠা' হবে 'যেখানে সকল নাগরিকের জন্য আইনের শাসন, মৌলিক মানবাধিকার এবং রাজনৈতিক, অর্থনৈতিক ও সামাজিক সাম্য, স্বাধীনতা ও সুবিচার নিশ্চিত' হবে।

রাষ্ট্র হিসাবে বাংলাদেশ জনগণের মঙ্গল এবং জাতীয় জীবনের সর্বত্র উচ্চাদর্শ প্রতিষ্ঠায় নিবেদিত। বাংলাদেশের স্বাধীনতার ঘোষণাপত্রে 'জনগণের জন্য সাম্য, মানবিক মর্যাদা ও সামাজিক সুবিচার নিশ্চিতকরণ' এবং 'জাতিসংঘের সনদ মেনে চলার' প্রতিশ্রুতি প্রদান করা হয়েছে। ন্যায়ভিত্তিক, দুর্নীতিমুক্ত, শুদ্ধাচারী রাষ্ট্র ও সমাজ প্রতিষ্ঠার মাধ্যমেই কেবল মানবসত্তার সেই মর্যাদা এবং মূল্যের প্রতি শ্রদ্ধাবোধ নিশ্চিত করা সম্ভব।

১.২ শুদ্ধাচারের ধারণা

শুদ্ধাচার বলতে সাধারণভাবে নৈতিকতা ও সততা দ্বারা প্রভাবিত আচরণগত উৎকর্ষ বুঝায়। এর দ্বারা একটি সমাজের কালোত্তীর্ণ মানদণ্ড, নীতি ও প্রথার প্রতি আনুগত্যও বুঝানো হয়। ব্যক্তিপর্যায়ে এর অর্থ হল কর্তব্যনিষ্ঠা ও সততা, তথা চরিত্রনিষ্ঠা। এই দলিলটিতেও শুদ্ধাচারের এই অর্থকেই গ্রহণ করা হয়েছে। ব্যক্তির সমষ্টিতেই প্রতিষ্ঠান সৃষ্টি হয় এবং তাদের সম্মিলিত লক্ষ্যই প্রতিষ্ঠানের লক্ষ্যে প্রতিফলিত হয়। প্রাতিষ্ঠানিক শুদ্ধাচার প্রতিষ্ঠায় ব্যক্তি পর্যায়ে শুদ্ধাচার অনুশীলন অত্যন্ত গুরুত্বপূর্ণ; সমন্বিত রূপ হিসাবে প্রাতিষ্ঠানিক শুদ্ধাচার অনুশীলনও জরুরি। রাষ্ট্রীয় আইনকানুন ও অন্যান্য প্রাতিষ্ঠানিক নিয়মনীতি এবং দর্শন এমনভাবে প্রণীত ও অনুসৃত হওয়া প্রয়োজন যাতে এগুলি শুদ্ধাচারী জীবন প্রতিষ্ঠায় সহায়ক হয়। বাংলাদেশের সমাজ বিভিন্ন খাত, যথা রাষ্ট্রে, ব্যবসা-প্রতিষ্ঠান এবং সুশীল সমাজে বিভিন্ন আইনকানুন, নিয়মনীতি, ঐতিহ্য ও সংস্কৃতি পালন ও লালন করে শুদ্ধাচার অনুশীলন করে চলেছে এবং সময়ের চাহিদা অনুযায়ী তাতে সংস্কার ও উন্নয়ন সাধন করেছে।

১.৩ শুদ্ধাচারের সংবিধানিক ধারণা

বাংলাদেশের সংবিধানের চেতনা নির্দেশ করে যে, বাংলাদেশ হবে একটি ন্যায়ভিত্তিক, শুদ্ধাচারী সমাজ; এর নাগরিকবৃন্দ, পরিবার, রাষ্ট্রীয় ও ব্যবসা-প্রতিষ্ঠান এবং সুশীল সমাজও হবে দুর্নীতিমুক্ত ও শুদ্ধাচারী। ব্যক্তিমানুষের জীবন ও সম্পত্তির নিরাপত্তা ও অধিকার সংরক্ষণ এবং সাংবিধানিক মৌলিক অধিকার প্রতিষ্ঠার জন্য রাষ্ট্রের আইনকানুন ও বিধিবিধান প্রণীত হয়েছে এবং অনুসৃত হচ্ছে। ১৯৭২ সালের ৪ঠা নভেম্বর তারিখে গৃহীত আমাদের সংবিধানে রাষ্ট্র পরিচালনায় কতিপয় মূলনীতি নির্ধারিত হয়। সেই অনুযায়ী আমাদের প্রত্যয় হল;

১. মানুষের ওপর মানুষের শোষণ থেকে মুক্ত ন্যায়ানুগ ও সাম্যবাদী সমাজলাভ নিশ্চিতকরণ (১০ অনুচ্ছেদ);
২. মৌলিক মানবাধিকার ও স্বাধীনতা নিশ্চিতকরণ (১১ অনুচ্ছেদ);
৩. মানব সত্ত্বার মর্যাদা ও মূল্যের প্রতি শ্রদ্ধাবোধ নিশ্চিতকরণ (১১ অনুচ্ছেদ);
৪. সকল নাগরিকের জন্য সুযোগের সমতা নিশ্চিতকরণ (১৯ অনুচ্ছেদ);
৫. নাগরিকের মধ্যে সম্পদের সুখম বন্টন ও সুখম সুযোগ-সুবিধা নিশ্চিতকরণ (১৯ অনুচ্ছেদ);
৬. জাতীয় জীবনের সর্বস্তরে মহিলাদের অংশগ্রহণ ও সুযোগের সমতা নিশ্চিতকরণ (১৯ অনুচ্ছেদ);
৭. প্রত্যেকের যোগ্যতা বিবেচনা করে কর্মানুযায়ী পারিশ্রমিক নিশ্চিতকরণ (২০ অনুচ্ছেদ);
৮. কোন ব্যক্তিকে অনুপার্জিত আয় ভোগ থেকে অসমর্থকরণ (২০ অনুচ্ছেদ)

এই সূত্রে রাষ্ট্র ও সমাজে কার্যকরভাবে ন্যায় ও সততা প্রতিষ্ঠা এবং সফলতার সঙ্গে দুর্নীতি প্রতিরোধ এবং শুদ্ধাচার প্রতিষ্ঠা সরকারের একটি মূলনীতি।

২. শুদ্ধাচার সম্পর্কিত সাধারণ ধারণা

২.১ প্রাতিষ্ঠানিক শুদ্ধাচারের গুরুত্ব:

শুদ্ধাচারের মাধ্যমে

- কর্মকর্তা-কর্মচারীদের মূল্যবোধ উন্নত হয়;
- সেবা প্রত্যাশীদের বিশ্বাস, আস্থা এবং সন্তুষ্টি নিশ্চিত হয়;
- সেবা প্রত্যাশীদের সাথে সম্পর্ক উন্নত হয় এবং প্রতিষ্ঠানের প্রতি সেবা প্রত্যাশীদের আস্থা বৃদ্ধি পায়;
- ব্যয় নিয়ন্ত্রণ ও সাশ্রয় সম্ভব হয়;
- দাপ্তরিক কাজের দক্ষতা বৃদ্ধি পায়;
- প্রতিষ্ঠানের সুনাম বৃদ্ধি করে; এবং
- আইনগত ভিত্তি প্রতিষ্ঠার মাধ্যমে সমস্যা সমাধান দ্রুত হয়।

২.২ প্রাতিষ্ঠানিক শুদ্ধাচার চর্চার প্রভাবকসমূহ:

- ব্যক্তিগত মূল্যবোধ, সততা, চারিত্রিক বৈশিষ্ট্য;
- কর্মকর্তা-কর্মচারীদের পছন্দ এবং কাজের পরিবেশ ও সুযোগসমূহ;
- কর্তৃপক্ষের ক্ষমতার ব্যবহার;
- সামাজিক অবস্থা;
- তথ্যের ব্যবহার; এবং
- কর্তৃপক্ষের অস্বচ্ছ দিক নির্দেশনা।

২.৩ প্রাতিষ্ঠানিক শুদ্ধাচারের ভিত্তিসমূহ:

- পদ্ধতি অনুসরণ করে;
- প্রতিষ্ঠান নেতৃত্বদানকারীদের দায়িত্ব ও শুদ্ধাচার পালন; এবং
- শুদ্ধাচার অনুসরণকারী প্রতিষ্ঠান গড়ে তোলা নেতৃত্বের বড় চ্যালেঞ্জ।

২.৪ প্রাতিষ্ঠানিক শুদ্ধাচার ও বিবেচ্য বিষয়সমূহ:

- ব্যক্তিগত মূল্যবোধ ও বিশ্বাসসমূহ;
- প্রাতিষ্ঠানিক মানদণ্ড, নীতি ও প্রথা;
- গৃহীত সিদ্ধান্ত বা কার্যক্রমসমূহ যে সমস্ত প্রাতিষ্ঠানিক মানদণ্ড, নীতি ও প্রথাকে প্রভাবিত করে; এবং
- গৃহীত সিদ্ধান্ত বা কার্যক্রম যে সমস্ত ব্যক্তি বা ব্যক্তিগণকে ক্ষতিগ্রস্ত বা সহযোগিতা করে।

৩. মতস্য অধিদপ্তরে জাতীয় শুদ্ধাচার কৌশল বাস্তবায়ন প্রক্রিয়া

১) সাংগঠনিক ব্যবস্থাপনা:

- নৈতিকতা কমিটি গঠন;
- নৈতিকতা কমিটির নিয়মিত সভা আয়োজন;
- শুদ্ধাচার ও সুশাসনের সমস্যাসমূহ চিহ্নিত ও সমাধানে আলোচনা অনুষ্ঠান;
- সংস্থা পর্যায়ে নৈতিকতা বৃদ্ধির জন্য নিজস্ব কর্মপরিকল্পনা প্রণয়ন; এবং
- শুদ্ধাচার ফোকাল পয়েন্ট নিয়োগ।

২) সচেতনতা বৃদ্ধি:

- শুদ্ধাচার কৌশল বাস্তবায়নে মাঠ পর্যায়ের কর্মকর্তাদের সচেতনতা বৃদ্ধিমূলক প্রশিক্ষণ প্রদান; এবং
- প্রত্যেক প্রশিক্ষণ কোর্স কারিকুলামে শুদ্ধাচার বিষয়ক একটি অধিবেশনের অন্তর্ভুক্তকরণ।

৩) বিদ্যমান আইন ও বিধি-বিধান এবং সমস্যা চিহ্নিতকরণ ও সংস্কার।

৪) পুরস্কার প্রদান: পদক প্রদান, সনদ প্রদান, বিদেশ সফর, ইত্যাদি

৫) প্রাতিষ্ঠানিক সক্ষমতা বৃদ্ধিকরণ:

- মতস্য অধিদপ্তরের কর্মকর্তাগণের শুদ্ধাচার বিষয়ে প্রশিক্ষণ প্রদান
- মতস্য অধিদপ্তরের সাক্ষরিত প্রশিক্ষণ একাডেমিতে অনুষ্ঠিতব্য বুনিয়াদী প্রশিক্ষণ কোর্সে শুদ্ধাচার বিষয় অন্তর্ভুক্তকরণ।

Session Plan

Day: 06	Session: 6.6	Duration: 45 Minutes
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Session Title: Course evaluation and closing ceremony

Learning objectives

During this session following activities will be performed:

Course Evaluation:

- Course evaluation forms are distributed to the participants
- Clear instructions on how to fill out the forms are given
- The forms are collected and collated
- The results are analyzed to identify areas of improvement
- The results are shared with the participants

Closing Ceremony:

- The participants are welcomed and acknowledged
- Key takeaways from the training program are reviewed
- Participants are encouraged to network with each other
- Speeches by 2 of the participants;
- Speech of the Chief Guest (if any);
- Certificates of completion are distributed
- A closing speech is given by the course coordinator/facilitator and participants are thanked for their participation
- A formal closure or any other suitable activity is ended with.
- Vote of thanks and closing ceremony.

Methodology: Speech and discussion

Materials: Banner & Sound System

Session management process

Steps	Main topics of discussion	Session presentation process	Time
Step-1	Introduction	Welcome the participants to the session and explain the purpose of the session and the topics to be discussed	5 Minutes
Step-2	Course review and evaluation	Ask the participants to rate the training by distributing the course evaluation chart. Later, 2 of the participants were invited for a brief discussion on the overall topic of the training.	15 Minutes
Step-3	Closing	Then thank everyone on behalf of the trainers and ask the organizing authority, if present, to conclude the training.	15 Minutes

Post-Training Assessment Questionnaire

Total number: 100 and all questions are of equal value

Time: 20 minutes

Name:

Designation & affiliation:

Put a tick (✓) where applicable

1. Elaborate the following terms-
 - a) GMP -
 - b) SCP -
 - c) HACCP -
 - d) CCP -
2. What are the major good practices for ensuring environmental integrity in aquaculture activities?
 - a) Monitoring farm environmental quality and efficient water management
 - b) Using hatchery-produced seed for culture
 - c) Construction and waste disposal should be conducted responsibly
 - d) All of the above
3. HACCP is a system of food safety hazard controls rather than reactive one.
 - a) Corrective
 - b) Protective
 - c) Preventive
 - d) None of the above
4. The HACCP concept was first applied to food production during efforts to supply safe food for the United States space program in the early
 - a) 1980s
 - b) 1960s
 - c) 1970s
 - d) None of the above
5. is a system that ensures that the goods produced by various manufacturing facilities are consistently produced and controlled according to specified quality standards.
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
6. Identified hazards which are inherent to the product or are associated with a discrete processing step must be controlled with
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
7. Hazards associated with the processing environment or personnel are usually better controlled with
 - a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above

8. is the transfer of biological or chemical contaminants to food products from raw foods, food handlers, or the food handling environment.
- a) Prevention
 - b) Correction
 - c) Contamination
 - d) Cross-contamination
9. A is defined as any biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of control(s).
- a) GMP
 - b) Hazard
 - c) SCP
 - d) None of the above
10. Unique hazards those are associated with specific types or species of finfish and shellfish.
- a) Process-related hazard
 - b) Species related hazards
 - c) Aquaculture drugs
 - d) None of the above
11. Potential food safety hazards that may be associated with specific types of finished fishery products as a result of the finished product form, the package type, the method of distribution and storage, or the processing methods that are used.
- a) Process-related hazard
 - b) Species related hazards
 - c) Aquaculture drugs
 - d) None of the above
12. Common viral pathogens associated with fish and fishery products?
- a) Hepatitis A Virus
 - b) HIV
 - c) Influenja
 - d) None of the above
13. When a bacterium exists as a spore, it is very resistant to chemicals, heat and other treatments that would normally be lethal to non-sporeforming bacteria.
- a) True
 - b) False
14. GMP & SCP are Pre-requisite in order to implement HAACP program.
- a) True
 - b) False
15. Histamine production in finfish can be controlled by -
- a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
16. Contamination with pathogens due to not washing hands before touching product by processing worker can be controlled by -
- a) GMP
 - b) HACCP
 - c) SCP
 - d) None of the above
17. Which is not a preliminary step before building a HACCP plan?
- a) Assemble HACCP team
 - b) Describe the product
 - c) Corrective action
 - d) Develop a process flow chart

18. When developing a process flow chart, it is not important to include all the process steps within the facility's control from receiving through final product storage, including reworked product if applicable.
a) True
b) False
19. Which is not a control measure to prevent, eliminate or reduce identified hazard to an acceptable level?
a) Time/temperature controls
b) Freezing
c) Pressing
d) Cooking
20. For each significant hazard that was identified during the hazard analysis, there are one or more points or steps in the process where the hazard can be controlled.
a) Critical limits
b) Critical Control Points
c) Corrective actions
d) None of the above
21. A critical limit represents the boundaries that are used to ensure that a hazard has been controlled (prevented, eliminated, or reduced to an acceptable level) at each CCP.
a) True
b) False
22. Information sources for establishing critical limits except
a) Hazard guides
b) Rules & regulations
c) Experts
d) Magazines
23. A planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record to demonstrate that critical limits have been met.
a) Correction
b) Records
c) Monitoring
d) None of the above
24. Predetermined corrective actions provide a "how-to" guide that describes the steps that need to be taken when a critical limit deviation occurs.
a) True
b) False
25. Verification includes the procedures that are needed to ensure that the HACCP plan is designed properly and has been implemented correctly.
a) Correction
b) Verification
c) Monitoring
d) None of the above

Training course on “Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products”

Course Assessment Questionnaire

(Evaluate session objectively considering content, presentation, comprehensibility, training material and timing.)

Name of Training Centre: Date:

Tick (✓) in the correct space

- | | |
|--|--|
| 1. Overall, was the course useful to you? | ☐ Yes ☐ No |
| 2. How was the duration of the course ? | ☐ Too long
☐ Correct
☐ Very short |
| 3. How was the pace and consistency of the course presentation ? | ☐ Too fast
☐ Correct
☐ Slow |
| 4. How was the balance between theory and practical/exercise in the session? | ☐ Very practical
☐ Correct
☐ Too much theoretical |
| 5. How understandable was the facilitator's presentation to you? | ☐ Very easy
☐ Easy
☐ Complex |
| 6. What was the quality of the training materials provided in the training? | ☐ Very good
☐ Good
☐ Not good |
| 7. What was the atmosphere like? | ☐ Very good
☐ Good
☐ Not good |
| 8. Whether the various training techniques used in the course were useful? | ☐ Useful
☐ Usual
☐ Not useful |

9. Session Evaluation Chart (Please tick (✓) in the correct place considering the accuracy, presentation and understanding of the session)

N.B. 1=Very good, 2=Good, 3=Fair, 4=Could be better, 5=Not good at all.

Sl.	Session Title	Very good	Well	Average	Could have been better	Not good at all
1.	Course and Participant Profile	1	2	3	4	5
2.	Opening and introduction of participants	1	2	3	4	5
3.	Review on Good Aquacultural Practices (GAP) and introduction to GMP, GHP, SCP & HACCP	1	2	3	4	5
4.	Overview to Good Manufacturing Practices, GMP regarding personnel, Processing plant & grounds and Sanitary operations	1	2	3	4	5
5.	GMP regarding Sanitary facilities & controls; Equipment & utensils; Warehousing & distribution; holding & distribution of by-products and defect action levels	1	2	3	4	5
6.	GMP regarding Processes and controls	1	2	3	4	5
7.	Good Hygiene Practices (GHP) in processing of fishery products	1	2	3	4	5
8.	Introduction to Sanitation Control Procedures (SCP)	1	2	3	4	5
9.	Condition and Cleanliness of Food Contact Surfaces	1	2	3	4	5
10.	Prevention of cross-contamination	1	2	3	4	5
11.	Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities	1	2	3	4	5
12.	Protection from adulterants	1	2	3	4	5
13.	Proper labelling, storage, use of toxic compounds and control of employee health conditions	1	2	3	4	5
14.	Exclusion of pests	1	2	3	4	5
15.	Seafood Safety Hazards: Pathogens	1	2	3	4	5
16.	Seafood Safety Hazards: Species & Process related hazards	1	2	3	4	5
17.	Pre-requisite Programs for HACCP implementation	1	2	3	4	5
18.	Preliminary steps: Assemble a HACCP team	1	2	3	4	5
19.	Preliminary steps: Describe the product, intended use and consumers	1	2	3	4	5
20.	Preliminary steps: Develop a process flow chart and process description	1	2	3	4	5
21.	Exercise- Develop a process flow chart and process description	1	2	3	4	5
22.	HACCP Principle 1- Hazard Analysis	1	2	3	4	5

Sl.	Session Title	Very good	Well	Average	Could have been better	Not good at all
23.	Exercise – Hazard Analysis	1	2	3	4	5
24.	HACCP Principle 2- Determine CCP	1	2	3	4	5
25.	Principles 3- Establish Critical limits	1	2	3	4	5
26.	Exercise – Establish critical limits	1	2	3	4	5
27.	HACCP Principles 4- CCP Monitoring; Principle 5- Corrective actions	1	2	3	4	5
28.	HACCP Principle 6- Establish Verification Procedure; Principle 7- Record Keeping Procedure	1	2	3	4	5
29.	দুর্যোগ ব্যবস্থাপনা (Disaster Management)	1	2	3	4	5
30.	জেন্ডার সচেতনতা এবং শুদ্ধাচার (Gender Awareness and Integrity)	1	2	3	4	5
31.	Course evaluation and closing ceremony	1	2	3	4	5

10. Write your suggestions and comments for further course development (write on separate page if necessary):

Training course on “Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products”

Course report

At the end of the course, the course coordinators and trainers will prepare the “**Course Report**” and send it to the regional office of the project, which will later compile the information of all courses of the same type in the same format and send it to the head office of the project, which will help in preparing the annual training report of the project. The structure of the course report will be as follows:

Course Code: **Course Name:** **Venue:** **Date:**

1. Participant information

1.1 Number of participants on male-female basis

Male	Female	Total

1.2 Number of participants based on educational attainment

High School	Degree	Masters	Ph.D	Total

1.3 Number of participants by age

20-30 years	31-40 years	41-50 years	51-60 years	Total

2. Number obtained in pre-training assessment

Average Number	Minimum Number	Highest Number

3. Training expectations

- A.
- B.

4. Topics mentioned on the graffiti board

- A.
- B.

5. Compiled Course Evaluation Sheet

6. The number obtained in the post-training evaluation

average number	Minimum no	highest number

7. Recommendations

- 7.1 Participant recommendations
- 7.2 Instructors' recommendations
- 7.3 Recommendation of course coordinator

Annexure: 1. Registration Sheet; 2. Daily Attendance Sheet; 3. All Answer Sheets of Pre-Training Assessment; 4. Course Evaluation Sheet; 5. All Post-Training Assessment Answer Sheets; and 6. Three Photographs (close-ups of venue, classroom with banners and participants).

Training course on “Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products”

Course Observation Checklist

As part of course monitoring during the session, the course coordinator and/or any other senior official will observe the entire session presented by a facilitator using the following checklist and at the end of the observation give feedback to the facilitator so that s/he can rectify her/his mistakes in the session and improve himself for the next session.

Put tick (✓) marks after observing the following correctly:

1.	Trainer's note used	
2.	Worn appropriate clothing	
3.	Understood the target group	
4.	Arranged suitable seats	
5.	Done something for the welfare of trainees	
6.	Been friendly with trainees	
7.	Taken effective roles during conducting sessions	
8.	Connected with previous sessions or activities	
9.	Motivated trainees about the content of the session	
10.	Focused on the session and effectively explained the purpose of the session	
11.	Been patient throughout the session	
12.	Been more energetic and motivated	
13.	Demonstrated an open-minded approach in all matters.	
14.	Had a clear understanding of the content	
15.	Maintained continuity of training content	
16.	Controlled session and content time	
17.	Used a clear and understandable voice	
18.	Made correct and elegant gestures	
19.	Used the right question-pause-name (QPN) technique	
20.	Ensured participation of all participants	
21.	Had a role in managing complex team members	
22.	Properly used training materials	
23.	Used a variety of training aids	
24.	Properly displayed visual aids	
25.	Been confident in content and trainees	
26.	Involved trainees in group work	
27.	Observed group work	
28.	Verified the purpose of the session	
29.	Distributed handouts and checked for understanding	
30.	Summarized content at the end of the session	
31.	Linked to the subsequent session	
32.	Session ended formally	
33.	Organized and cleaned training materials and equipment.	

Training Assessment

1. How would you rate the overall quality of the training program?
2. Was the content of the training program relevant to your job role?
3. Were the training materials and resources effective in helping you understand the concepts?
4. Was the pace of the training appropriate for you?
5. Were the trainer's teaching methods effective in helping you understand the material?
6. Were the practical examples and case studies used in the training helpful in reinforcing your understanding of the concepts?
7. How would you rate the organization and structure of the training program?
8. Were the facilities and equipment used during the training adequate and suitable for your needs?
9. Have you been able to apply the knowledge and skills you gained from the training program in your work?
10. Would you recommend this training program to others in your organization or industry?
11. Do you have any suggestions for improving the training program in the future?
12. How satisfied are you with the training program overall?

Session 1: GMP (Good Manufacturing Practices)

1. Was the content of the GMP session clearly explained and easy to understand?
2. Were the examples and case studies used in the GMP session helpful in reinforcing your understanding of the concepts?
3. Have you been able to apply the GMP knowledge and skills you gained in your work?

Session 2: GHP (Good Hygiene Practices)

1. Was the content of the GHP session clearly explained and easy to understand?
2. Were the examples and case studies used in the GHP session helpful in reinforcing your understanding of the concepts?
3. Have you been able to apply the GHP knowledge and skills you gained in your work?

Session 3: SCP (Sanitation Control Procedures)

1. Was the content of the SCP session clearly explained and easy to understand?
2. Were the examples and case studies used in the SCP session helpful in reinforcing your understanding of the concepts?
3. Have you been able to apply the SCP knowledge and skills you gained in your work?

Session 4: HACCP (Hazard Analysis and Critical Control Points)

1. Was the content of the HACCP session clearly explained and easy to understand?
2. Were the examples and case studies used in the HACCP session helpful in reinforcing your understanding of the concepts?

3. Have you been able to apply the HACCP knowledge and skills you gained in your work?

Additionally, you may include questions related to the overall training experience, such as:

1. Was the length of the training sessions appropriate for your needs?
2. Were the facilities and equipment used during the training adequate and suitable for your needs?
3. How would you rate the effectiveness of the trainer in delivering the content?
4. Was the training environment conducive to learning?
5. Would you recommend this training program to others in your organization or industry?
6. Do you have any suggestions for improving the training program in the future?

Training course on “Pre-requisite programs GMP, GHP, SCP and implementation of HACCP for food safety management of fish and fishery products”

Course Observation Checklist

As part of course monitoring during the session, the course coordinator and/or any other senior official will observe the entire session presented by a facilitator using the following checklist and at the end of the observation give feedback to the facilitator so that s/he can rectify her/his mistakes in the session and improve himself for the next session.

Put tick (✓) marks after observing the following correctly:

1. Preparation		
	• Were the materials for the training course prepared beforehand?	
	• Were the materials relevant to the training course?	
	• Was the training course room set up properly with enough space for the participants and equipment?	
2. Facilitator		
	• Did the facilitators introduce themselves and explain their background?	
	• Did the facilitator provide a clear outline of the training course objectives and what was expected of the participants?	
	• Did the facilitator establish their authority on the subject matter?	
	• Did the facilitator use examples and anecdotes to illustrate their points?	
	• Did the facilitator provide feedback and answer questions from participants?	
	• Did the facilitator adapt their teaching style to meet the needs of the participants?	
3. Content		
	• Was the content of the training course relevant to the objectives?	
	• Was the content presented in a clear and concise manner?	
	• Was the content appropriate for the level of knowledge of the participants?	
	• Did the content include a mix of theory and practical exercises?	
	• Was the content delivered in a logical and structured way?	
4. Facilitator		
	• Did the facilitators introduce themselves and explain their background?	
	• Did the facilitator provide a clear outline of the training course objectives and what was expected of the participants?	
	• Did the facilitator establish their authority on the subject matter?	
	• Did the facilitator use examples and anecdotes to illustrate their points?	
	• Did the facilitator provide feedback and answer questions from participants?	
	• Did the facilitator adapt their teaching style to meet the needs of the participants?	
5. Participation		
	• Were the participants engaged throughout the training course?	
	• Were the participants encouraged to participate and ask questions?	
	• Was there adequate time for the participants to practice and apply the	

	concepts presented?	
6. Timing		
	• Was the training course delivered within the scheduled time frame?	
	• Were there any delays or interruptions that affected the delivery of the training course?	
	• Was there enough time allocated for each topic or activity?	
7. Technology		
	• Were the technology and equipment used during the training course working properly?	
	• Did the Facilitator have enough knowledge and experience in using the technology and equipment?	
	• Were there any technical difficulties during the training course, and if so, how were they resolved?	
8. Evaluation		
	• Did the participants give feedback on the training course?	
	• Was the feedback positive and constructive?	
	• Was the feedback used to improve the training course in the future?	
9. Overall		
	• Was the training course successful in meeting its objectives?	
	• Was the training course well-organized and executed?	
	• Were the participants satisfied with the training course?	
	• Would you recommend this training course to others?	