

Safety and Hygiene Issues: Effects of training among dried fish processors at Chalan *Beel* area, Bangladesh

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Abstract

The present study was conducted from October 2014 to September 2015 to evaluate the effects of training in case of awareness development regarding pesticides and to determine the presence of pesticide of dried fish collected from different fish drying sites of Chalan *beel* area namely Atrai upazila of Naogaon district, Chatmohar and Vangura upazila of Pabna district, Singra upazila of Natore district and Tarash upazila of Sirajganj district. Before training, 59% processors were found to use pesticide frequently and 26% processors were not involved in pesticide use, while after training, this level declined to 35 and 53% in terms of frequent using and not using of pesticide respectively. Before training, in case of district wise pesticide application states, 64, 18 and 18% in Naogaon; 50, 17 and 33% in Natore; 60, 10 and 30% in Pabna and 63, 12 and 25 % processor of Sirajganj were involved in frequent-use, occasional-use and not-use category respectively while after training, 37, 9 and 54% in Naogaon; 33, 17 and 50% in Natore; 40, 10 and 50% in Pabna and 29, 14 and 57% processors in Sirajganj belonged in respective category. Various organochlorine and organophosphorus pesticides were found to be used in the study area namely Fighter, Masterplus, Sobicron, Sumethion, Karate, Lamdagreen, etc. Generally, 1-2 full caps (10ml) pesticide is dissolved in 10-15L water which is used at the rate of 120-200kg fish/L solution. From the study no pesticidal residue was found in dried fish samples collected after training program. However, in reality, as many processors in the study area were still involved in pesticidal malpractice.

Keywords: Chalan *beel*, Dried Fish Processors, Pesticides, Malpractice, Food Safety, Freshwater fishes

Introduction

Drying is a common practice for conservation of fish in Bangladesh. The dried fish is properly known as '*Shutki*' (in Bangla) which is one of the popular food items in Bangladesh and it is a staple source of protein in many areas of Bangladesh. About 20% of total fish caught are sun dried and mostly consumed in the domestic market annually (BBS, 2005). Bangladesh earned 36.74 core BDT through exporting 2845MT dried fish in 2014-2015 fiscal year (DoF, 2016).

In monsoon period, due to high moisture content in the weather and dump condition, the dried fishes absorb moisture so rapidly that the fish becomes suitable for infestation. Under warm and humid condition, sun-dried fish rapidly become infested by blowfly larvae (Kordyl, 1976). To avoid such insect infestation and microbial contamination commercial dried fish processors often apply several harmful pesticides in fish (Bala and Hossain, 1998).

Studies on the conservation of dried fish showed that a mixture of organochlorine (DDT and heptachlor) is used in dried fish in Bangladesh (Bhuiyan *et al.*, 2008). These chemical control methods are usually effective, but there are serious health and environmental problems associated with chemical pesticides. Due to harmful effects on human health most of the hazardous pesticides are banned in Bangladesh for any type of use (Reza *et al.*, 2005).

Necessary training on raising awareness regarding harmful impact of pesticides and also on improved and viable methods for safe dried fish production can play a vital role. Therefore, this study aimed at evaluating the effect of training on present status of awareness among the dried fish processors of different drying yards of Chalan beel area with respect to pesticides application and along with pesticidal residue determination of dried fish.

Materials and Methods

The study was conducted for a period from October 2014 to September in five (05) Upazila of four (04) districts representing the most popular fish drying spot of Chalan beel area namely Atrai Upazila of Naogaon district, Chatmohar and Vangura Upazila of Pabna district, Singra Upazila of Natore district and last one Tarash Upazila of Sirajganj district. The study consists of two Phases- Field based and Laboratory based. For field based study, a total of 34 (6, Natore; 10, Pabna; 7, Sirajganj and 11, Naogaon) dried fish processors were selected through purposive sampling approach for questionnaire interviews which were carried out before and after training activities. For laboratory based study, five most popular fresh water dried fish samples namely Puti (*Puntious shopore*), Silver (*Hypophthalmichthys molitrics*), Boal (*Wallago attu*), Taki (*Channa punctatus*), Shol (*Channa striata*) were collected from Chalan beel area of different drying yards. Then the samples were packed in air tight polyethylene bags and brought to the DRICM, BCSIR, Dhaka for pesticidal residue analysis.

Survey based data were processed and analyzed using Microsoft Excel and pesticidal residues were determined by GCMS (model no. GCMS-TQ 8040, Shimadzu, 2010) with an Electron Capture Detector (an auto injector) and GC solution-2010 software.

Results and Discussion

Before Training

Before training, it was observed that 59% processors were found to use pesticide frequently and 15% of them used occasionally while 26% processors responded that they did not use pesticide (Figure 1). In case of frequently use, highest number (64%) of processors was found in Naogaon while lowest (50%) was found in Natore. In terms of occasional use highest (18%) and lowest (10%) was found in Naogaon and Pabna respectively. In the study area, 33% respondents belonging in Natore were found not to use pesticides (Figure 2).

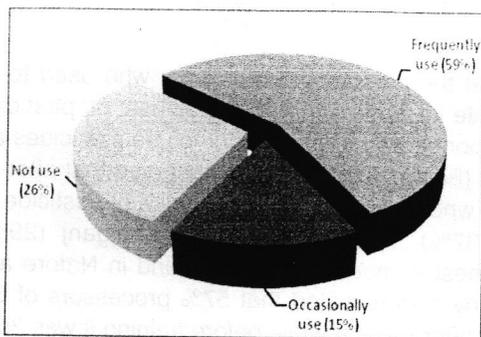


Figure 1: Status of insecticide use

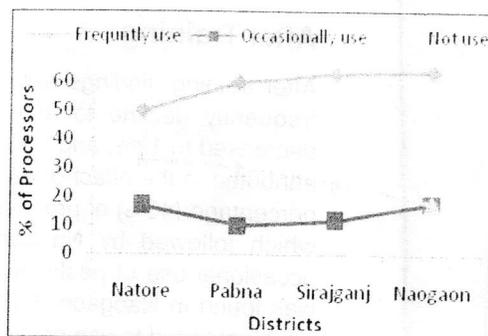


Figure 2: Status of district wise insecticide use

Various pesticides comprising the groups namely organochlorine and organophosphorus which includes Fighter, Masterplus, Sobicron, Sumethion, Karate, Lamdagreen, Carbofuran, Phos-Tab, Briferetc, were found to be applied in the study area. The processors applied pesticides at various dosages. Generally 1-2 full caps (equivalent to 10-20ml) of pesticide were dissolved in 10-15L water and the solution was sprayed at the rate of 120-200kg fish/L. In case of stored product, the granular pesticide like Basudin, Carbofuran, Phos-Tab etc. spread on the ground and then stored the products on its (Table 1). This finding is similar with the findings of Nowsad *et al.* (2010).

Table 1: Common pesticide and approximate doses used in drying spots

SL No	Trade name	Generic name	Approximate used doses
1.	Master plus 48EC/10EC	Chloropyriphos	1-2 cap/10-15L
2.	Greater48 EC	Chloropyriphos	1-2 cap/10-15L
3.	Fighter	Lamdacihalothrine	1-2 cap/10-15L
4.	Lamdagren2.5EC	Lamdacihalothrine	1-2 cap/10-15L
5.	Furadan SG	Carbofuran	15-20g/50-100 kg fish
6.	Brifer 5 G	Carbofuran 50 g CF/kg	15-20g/50-100 kg fish
7.	Sumithion 50 EC	Fenitrothion	1-2 cap/10-15L
8.	Fifonon 57 EC	Malathion	1-2 cap/10-15L
9.	Phos-Tab	Alamfox	5-6/50-60kg fish
10.	Basudin	100g Diazinon/kg	20-25g/50-60kg fish
11.	Karate 2.5 EC	Lamdacihalothrine	1-2cap/10-15L

N.B. 1cap=10ml (approximate)

Most of the processors were found to possess poor knowledge with regards to dose limit and hazardous impacts of pesticide. During the sunny days, processors were hardly seen to apply pesticide, in contrast, in the cloudy days pesticidal malpractices were observed very often in case of large fleshy fish like *Channa striata*, *Wallago attu*, *Hypophthalmichthys molitrix* etc. whereas small fish usually remained free from pesticidal application. Flowra *et al.* (2013) and Nowsad, (2005) also observed that pesticides were generally used for larger species of fish in cloudy days.

After Training

After training, findings reveal that the number of processors who used to apply pesticide frequently decline to 35%, while in case of occasional use of pesticides, the value decreased to 12%, and 53% respondents were found not to use pesticides and this may be attributed to the effect of training (Figure. 3). It was also observed that after training highest percentage (40%) of processors who involved in frequently use of pesticide found in Pabna which followed by Naogaon (37%), Natore (33%) and Sirajganj (29%). In case of occasional use of pesticide, highest number (17%) was found in Natore and lowest (9%) was found in Naogaon. This study also revealed that 57% processors of Sirajganj district were not found to use pesticides after training while before training it was 25% (Figure. 4).

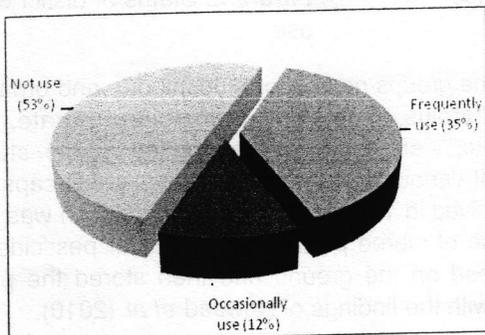


Figure 3: Status of insecticide use

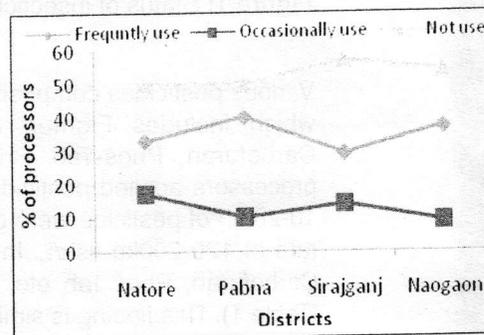


Figure 4: Status of district wise insecticide use

In case of laboratory results of five fresh water dried fish species (*Channa punctatas*, *Wallago attu*, *Puntious shopore*, *Hypophthalmichthys molitrics* and *Channa striata*) the mean concentrations of pesticide were not detected because of some positive impacts of training which might have reduced the probability of getting pesticide free dried fish samples.

Conclusion

From the study, it was noticed that awareness-building training had some impacts on making dried fish processors conscious regarding harmful effects of pesticides. However, by adequate training with certain interval on regular basis could result in expected level of awareness. But in reality, the prevailing training facilities were insufficient. Though the results of lab analysis showed the absence of pesticide in traditionally prepared samples, this was not the actual picture of the dried fisheries sector of the study area, because some processors were still involved in malpractice of pesticide use. Therefore, along with adequate training about pesticidal application and tolerance limit, monitoring and legal enforcements are required in order to address this unethical practice in dried fisheries sector.

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