

Granular Gur Manufacture and Its Storage

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ABSTRACT

Granular gur processing and packaging technique was developed during the period 2005-08. The quality of granular gur was studied during the period before and after storage. The attractive golden yellow coloured granular gur was manufactured hygienically avoiding hazardous chemical clarifiers during pan boiling. The extract of Wild Okra plant was used successfully as cane juice clarifier to avoid chemical clarifiers in gur processing. Hydrose is a dyeing chemical and hazardous for human health. The gur makers use hydrose intensively in gur processing only to change the colour of gur for higher market price. As an alternate of hydrose, the extract of wild okra was found effective in cane juice clarification during pan boiling. Granular gur was produced manually and sun dried on racks made of iron angle bars for 0, 1 & 2 days. For preservation of granular gur, packaging was completed hygienically after sieving in one kilo moisture proof polyethylene packet. The uneven granules of granular gur were grounded in a grinding machine for homogeneous granular form. The physical and chemical properties of granular gur were evaluated before and after storage. The quality of granular gur after sun drying for 2 days was found excellent in keeping quality and observed suitable for storage throughout the year. The attractive colour of granular gur was unchanged and as sweetener it was very popular to the gur consumers.

Key words: Granular Gur, manufacture, storage, quality.

INTRODUCTION

Gur is manufactured almost in all parts of Bangladesh where sugarcane is grown in abundance. Selection of sugarcane varieties/clones suitable for quality gur production is important. Manufacture of gur holds a very important place in the rural economy of the country where gur is produced on a large scale. In spite of this large scale production of gur, methods of manufacture of this important commodity still remain crude, wasteful and involved unhygienic condition. At present, hazardous chemicals are being indiscremenently added during gur processing by the gur makers which are harmful for human health. Gur quality is considered by its sucrose content, reducing sugars and colour etc. (Gopal and Chiranjivi, 1959). The quality of gur is dependent on the composition of juice from which gur is made. The methods of pan boiling and juice processing techniques are also associated with the quality of gur.

The manufacture of gur is confined to the cold months extending from to the middle of April. Early gur manufacture has also been noticed in month of September and October and the product has to be stored for consumption during the remaining part of the year. Gur under storage is liable to undergo deteriorates in quality and quantity. But due to lack of appropriate storage facilities storage problem of gur is of paramount importance. Storage of gur has not been satisfactory during the history of its production and considerable wastage (50%) has occurred (Rao *et al.*, 1983). During storage, fermentation sets in gur imparting an unpleasant taste and colour gets darkened. Partial loss in colour and flavour of gur is natural under storage in tropical and sub-tropical climate (Bengali Baboo, 1993).

In addition, gur storage conditions in Bangladesh are not satisfactory. About 30% wastage of gur takes place during monsoon season. Gur is normally prepared in solid and semi-solid form. Semi-solid gur deteriorate faster than solid gur due to higher moisture content. Solid gur also deteriorates during monsoon due to absorption of atmospheric moisture. Gur becomes liquified and fermentation takes place. Gur is highly hygroscopic in nature and as a result it becomes soft and sticky and often liquifies completely at high humidity period. Some microorganisms are responsible for fermentation which brings about various changes resulting in heavy losses both in weight and quality of gur (Farooque, 1960). There are wide variations in quality of gur prepared from different varieties like chemical composition of gur, colour and deterioration during storage (Patil *et al.*, 1994).

In such situation, step of granular form of gur production is the demand of time. The solid gur is converted into granular form during gur processing. Granular form of gur is free from all hazardous chemicals for human health. The processing and packaging of granular gur have been done maintaining hygienic condition. Granular gur preparation is same as conventional gur processing system. At the time of solidification of gur, granular form is made with the help of hattles manually. Granular gur is normally sun dried for two days for effective storage. Prepared granular gur is very attractive in colour, tasty, easily packagable, portable, easy for marketing and preservable throughout the year (Anon., 2009). Gur processing in such form has been popularised to the consumers. Granular gur contains less than 2% moisture as such storage quality remains unchanged throughout the year. In a view of the above facts, the research work was undertaken to investigate granular gur production techniques maintaining hygienic condition during processing and packaging for preservation throughout the year at normal environmental condition.

MATERIALS AND METHODS

Granular gur was manufactured in the month of December and January by open pan boiling method without adding any chemical clarificants. Plant extract of wild okra was added to clarify cane juice as an alternate of hydrose which was hazardous for human health. Granular gur was manufactured manually maintaining hygienic condition during gur processing. At the time of solidification, gur was converted into granular form with the help of hattles. The packaging of granular gur was done in moisture-proof polyethylene packet (one kg. in each packet) after sun drying for 0, 1 & 2 days of preparation. Before packaging, granular gur was sieved for uniform granular form and bigger granules were grounded in a gur grinding machine for homogeneous granular form of gur. After sun drying and packaging, packets of granular gur were preserved for year long at normal room temperature in a well ventilated room. Details chemical analyses have been performed before and after storage of gur. Physical and chemical properties of prepared granular gur have been determined for its sucrose content, colour transmittancy (at 0.25N solution), pH and reducing sugars by following the method of Roy (1954). Data on sucrose, colour, pH, moisture% gur and reducing sugars content of granular gur before and after storage were recorded. Recorded data have been presented graphically for discussion in Figures 1-5.

RESULTS AND DISCUSSION

During the period, granular gur production and packaging were completed. Matured cane of different varieties were selected and harvested from BSRI farm to manufacture granular gur. Pans made of stainless steel were used for boiling of cane juice to prepare granular gur. Hygienic conditions were maintained at all steps of granular gur processing during preparation. Plant extract of

Wild Okra was used as clarifying agent in cane juice as an alternate of hydrose. Hydrose is a hazardous chemical for human health. The amount of extract from a normal matured plant of Wild Okra was found effective to clarify one pantful of juice (200-220 kg). The colour of granular gur was very attractive. The bright golden yellow coloured granular gur was packaged hygienically in polyethylene which was very popular to the consumers. Granular gur was sun dried for 0, 1 & 2 days of its preparation and preserved at normal environment condition after packaging. Racks made of iron angles and polyethylene sheets of 2.5'x 6.0'x3.5' sizes were used for proper sun drying of granular gur and to maintain hygienic condition during the period.

The colour transmittancy of granular gur before and after preservation was shown in the Figure 1. The colour transmittancy of packaged granular gur sundried for two days and preserved throughout the year at normal room temperature was found almost similar (66.6 & 65.8). The same preserved and sun dried granular gur samples for 0 & 1 day were observed to deteriorate faster than that of packaged granular gur which was sundried for two days. This finding was agreed with the results of Sarker *et al.* (1985) that gur sun dried for two days contains moisture level below 2% and preserves longer if packaged in moisture-proof polyethylene packet. So that quality of preserved granular gur was unchanged without any deterioration. Sarker *et al.* (1985) also reported that light coloured gur is always preferred by consumers as sweetneer and normally good quality gur is characterized by its light colour.

Sucrose per cent in samples of sun dried granular gur for 0, 1 and 2 days were determined before and after storage. The results were shown in Figure 1, in bar diagrams. It was observed from the bar diagrams that there was no inversion of sucrose in the samples of sun dried granular gur for 2 days during the whole period of preservation. It was also observed from the same Figure that sucrose % of the samples sun dried for 0 and 1 day were decreased after storage due to inversion of sucrose. In case of reducing sugars per cent of the same samples sun dried for 2 days similar results were observed. (Fig. 3). But the trend of reducing sugars per cent were increasing to some extent during the preserving period of the samples of granular gur sun dried for 0 and 1 day. The results were agreed with the results obtained by Gaur *et al.* (1979) who reported that a good quality gur should have high sucrose and low reducing sugars per cent and it keeps unchanged without any deterioration. Gur containing higher per cent of reducing sugars are generally discouraged for preservation; because reducing sugars are hygroscopic in nature, lead to poor keeping quality and low self-life.

The pH values from the same granular gur samples were recorded before and after storage. The results were shown in Figure 4. Lower pH value indicates acidic in nature. Figure 4 showed that pH values of granular gur samples sun dried for two days are same (5.8) before and after preservation. The same values of the samples sun dried for 0 and 1 day were decreased due to preservation throughout the year. During preservation, moisture content plays important role. From Fig.5, it was observed that keeping quality of granular gur sun dried for 2 days was found the most suitable. The moisture per cent was found unchanged during the period of preservation (1.5 %). No moisture migration was observed in the samples of preserved granular gur. In case of granular gur sun dried for 0 day and 1 day, moisture percent was maintained above 2%. Though the moisture percent remained unchanged after storage, slight stickiness in samples of granular gur was found in the monsoon season. Higher percentage of moisture containing gur is not suitable for long term preservation (Gaur *et al.*, 1979). Granular gur was very popular to the gur consumers. Prepared granular gur was attractive in colour. Granular gur sun dried for two days can be successfully preserved throughout the year at normal environment condition. The overall quality of granular gur was unchanged. It was easily packagable, transportable and storable.

REFERENCES

- Anonymous, 2009. BSRI Annual report. 2006-2007, Bangladesh Sugarcane Research Institute, Ishurdi, Pabna, Annual report, 2006-2007. p. 92.
- Bengali Baboo, 1993. Manufacture of good quality gur (Jaggery) and its safe storage. Indian Institute of Sugarcane Research, Raebareli Road, Lucknow-226002. pp. 295-310.
- Farooque, M. 1960. Role of microorganism in deterioration of gur in storage. *Indian J. Sugar. Res. dev.*, 1: 69-71
- Gaur, S. L.; Ranadive, S. L. and Jawalekar, D. V. 1979. Effect of sugarcane varieties on the keeping quality of gur. *Indian Sugar Crop J.*, Jan.-March, pp. 18-20.
- Gopal, A. K. V. and Chiranjivi, R. K. 1959. Studies on the relation of the chemical composition of cane juice and the quality of jaggery with special reference to the new Co. canes. *Proc. ISSCT.*, 10 : 825-828.
- Patil, J. P. and Singte, A. K. 1982. Effect of potassium fertilization and sugarcane varieties on quality of jaggery. *IS*, Vol. 32, P277-379.
- Roy, S. C. 1954. Monograph on the gur industry of India. pp. 55-64.
- Rao, J. T.; Nataranjan, B. V. and Bhagyalakshmi, K. V. 1983. *Sugarcane*. ICAR, New Delhi. pp. 92-103.
- Sarker, M. A. A.; Jabber, M. A.; Alam, M. R. and Hoque, J. 1985. Sugarcane variety for gur production. *Bangladesh J. Sugarcane*. 7 : 76-78.