

Present status of handling, transportation and processing of traditional dried *Punti* (*punti shutki*) and semi-fermented fish (*chepa shutki*) products in Mymensingh district, Bangladesh

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Abstract: Studies were conducted to evaluate the present status of traditional dried *punti* (*punti shutki*) and semi-fermented fish products (*chepa shutki*) in Mymensingh district, Bangladesh. A survey was made on the source of raw material, handling, transportation and production process, preservation of finished products and quality aspects of the finished products using questionnaire through interview among cross section of people involved in value chain. It was found that semi-fermented fish products were produced in winter season using *punti shutki*. After harvesting, the small-scale fishermen carried their catch to the landing center in traditional bamboo baskets without adequate ice. Boat, rickshaw, van etc. are mainly used in transportation of fish using steel made ice box, bamboo basket and plastic drum. It was observed that there were facilities of ice storage in each depot in the study area. The producers, wholesalers and retailers had adequate knowledge about the production techniques of traditional dried fish and *chepa shutki* but they have little or no idea about the quality management of the products. Marketing chain of these products varied between season to season and place to place. The storage duration of the traditional dried *punti* and *chepa shutki* varied from 1-8 weeks and 3-6 months, respectively at different levels from producer to retailer. Although there were frequent complaints from the consumers about the use of insecticides in the fish products for prolonging shelf life during storage, the wholesalers and retailers did not admit the use of any insecticide or preservatives in their products to prevent insect infestation. In terms of storage technique, 64% retailers stored their products in clay vats whereas remaining 36% retailers stored in plastic bucket or wooden box without any proper packaging.

Key words: *Punti shutki*, *Chepa shutki*, semi-fermented product, traditional drying, quality loss

Introduction

Traditional fishery products are native to a country or culture. Major traditional fishery products of Bangladesh include dried, semi-fermented (*chepa shutki/sheedal shutki*), fermented, salted and some smoked products (BOBP, 1985). A large part of Bangladeshi people use *chepa shutki* as various food items. This product is available in the domestic market which is very important for a number of reasons (i) this product has survived and persisted over the centuries in Bangladesh, (ii) it is important in the nutrition of the poor and economically deprived people and (iii) it is generally a low cost method of processing. This is why traditional fish and fishery products like *chepa shutki* are very important in Bangladesh where large number of people suffers from various chronic malnutrition. The people prefer *chepa shutki* because of its taste and low cost compared with larger commercially important fish as table fish (Khanum *et al.* 1999).

Chepa shutki is the most common processed food made from traditional small-size fish commonly called *punti* which is very popular in Bangladesh. Although *chepa shutki* serve as a cheap source of protein, yet the knowledge about its nutritional quality is very limited. In recent years the people are not only conscious about the nutritional value of a food, they also insist that the product should be acceptable in respect of both safety and quality. However to increase the utilization of *chepa shutki* widely, information about the food quality as well as other health benefit is equally important.

Semi-fermentation is one of the most important methods of preserving fish in Bangladesh. A large number of people of Mymensingh, Netrokona, Kishorgonj, Brahmonbaria, Jamalpur and Tangail region are engaged with the production and marketing of semi-fermented fish products and its play a vital role to increase their socio-economic condition (Mansur, 2007). They are mainly produced during winter season because of the availability

of raw material, favorable weather condition and lower price. The available reports suggest that considerable post-harvest loss take place during various stages of handling, transportation and preservation (Nurullah, 2005). Due to lack of adequate transport, storage and preservation facilities, a huge amount of fish are assumed to be spoiled during various stages of handling, transportation and preservation and cannot be utilized properly, and, what is more there have been no systematic studies conducted regarding this matter.

Little or no information is yet documented about the source of raw material, handling, transportation and production process, preservation of finished products and quality aspects of dried *punti* and *chepa shutki* products since there has been no elaborate survey in the past. The present study describes the status of handling, transportation and processing of dried *punti* fish and *chepa shutki* in Barhatta, Allokdia and Mohongonj of Netrokona, and Keuatkhali and Kalibari of Mymensingh district, Bangladesh.

Materials and Methods

Survey on handling, transportation and processing of *punti shutki* and *chepa shutki*

A survey was conducted over a period of 2 months from January 6 to February 17, 2008, at the fish landing centers, receiving centers (*fish depots*) and processing areas of Barhatta, Allokdia and Mohongonj of Netrokona, and Kewatkhali and Kalibari of Mymensingh district. Information was collected on prescribed survey forms with through direct interview with processors, wholesaler, retailer and dry fish producer. The major aspects of information collected were (i) raw materials collection system, (ii) season of production, (iii) preservation of raw materials and finished product, (iv) use of preservative/chemicals, (v) manpower involvement, (vi)

production process, (vii) quality of the finished product, (viii) income and expenditure and (ix) socio-economic aspects.

Quality aspects of dried *punti* and *chepa shutki*

Samples of dried *punti* and *chepa shutki* were collected producer of Netrokona, Mymensingh and from wholesaler and retailer from Kewatkhali Bazar, Kalibari and K.R. market of Mymensingh district and used for quality assessment study by organoleptic methods. After purchasing, samples were packed tightly in separate polyethylene bags and brought to the Laboratory of Fisheries Technology, Bangladesh Agricultural University (BAU), Mymensingh, and stored at -20°C until use. The organoleptic quality evaluation method used in this study was based on the method currently used by Fish Inspection and Quality Control (FIQC) of Department of Fisheries (DoF), Ministry of Fisheries and Livestock, Government of Bangladesh, with slight modification.

Results and Discussion

Status of raw material collection system

Usually landings occur in the morning and in the afternoon and fish are sold through auction. The major species in the landings of *punti*, *chapila*, *tengra*, *taki*, *shol*, *mola*, *shingi* etc. These fishes were caught using different types of nets including *ber jal*, *jagat ber jal*, cast net etc. The price fixation of raw materials was done by open bidding system. Boat, rickshaw, van etc. were mainly used for transportation of fish. Steel made ice box, bamboo basket and plastic drum mainly used for carry fish during transportation. There were facilities of ice storage in each depot but 90% people did not have sufficient knowledge on fish quality. In each landing center there were some depots where the raw materials were received. Most of the depots (90%) were constructed with brick, wood and bamboo pools (Table 1). Floors of most all the depots were cemented. It was found that electric supply and storage facilities were not available all the depots.

Table 1. Characteristics of fish landing center, dried *punti* processing center and *chepa shutki* processing center

Infrastructure conditions	Landing centre	Dried <i>punti</i> processing centre	<i>Chepa shutki</i> processing centre
Room construction	Corrugated tin, bricks, wood and bamboo	Corrugated tin wall, bamboo and <i>chatai</i>	Corrugated tin wall, bamboo and <i>chatai</i>
Floor condition	Cemented floor	100% earthen	100% earthen
Water supply	Under ground water	River and underground water	River and under ground water
Electricity	Available	Available	Available
Storage facility	Available	Available	Available

Status of dried *punti* processing

There were three dried fish processing centers located near the landing center in Barhatta, Allokdia in Netrokona and five in Kewatkhali and Kalibari of Mymensingh. The processors collected the raw materials from the depot of landing center or *aratdar*. The major species used for drying are *punti*, *chapila*, *tengra*, *shol* etc. Production of dried *punti* starts from October and continued until March of every year. In each processing center there was a small house made of corrugated tin, bamboo made *chatai*, jute etc where raw materials were collected and processed. Both river- and underground water was used for washing of raw materials.

Steps followed in drying of *punti shutki* included: (i) collection of raw materials, (ii) dressing and gutting, (iii) salting, (iv) washing, (v) sun drying, (vi) pre-packing treatment and (vi) storage.

In the study area, it was found that raw materials were collected from landing centers or directly from fishermen or from middlemen. Usually the small-scale fishermen brought their catch at the landing center using traditional bamboo made baskets to the pre-selected buyer or middlemen locally called *mohajan*. At the peak season of harvesting all the catch were not sold in the market and there was no adequate facilities such as cold storage/icing facilities to preserve the raw fish which resulted in cheaper price of the raw materials. After collection, raw materials

were gutted immediately. Generally women workers were involved in dressing, cutting and gutting. Most of the women workers did not get any remuneration. They only received offal and viscera of *punti* to extract fish oil which they sold to the *chepa shutki* processors. After gutting of fish, salting was done to protect fish from fly, insect, or their larval infestation. Sometime salts were used to get extra weight of fish. Generally 125 g salt was used for 1 kg fish. The next day after salting, the processed *punti* were kept overnight at room temperature and washed properly to remove salt and other particles from fish. Generally river water and underground water were used for this purpose. After washing, fishes were kept ready for sun drying which was done by spreading them on bamboo made *chatai* in the open field. Normally it took 2-3 days for proper drying depending on the weather condition. After drying, the products were taken out from drying yards and stored in bamboo basket. The products were graded according to quality and size. The dried fishes were stored finally in bamboo made basket or under the mats at room temperature until marketing. Here, filth and dust usually contaminated the dried products. Sometime insects caused infestation of the products (Reza *et al.*, 2005).

Status of *chepa shutki* processing

For the preparation of *chepa shutki*, the processor usually collected the dried *punti* from *shutki* processing centers. They carried the *shutki* by van, rickshaw, bicycle or truck.

Some of the processors also collected *shutki* from the wholesale and retail market. After collection they again sun dried the *shutki* for 10-12 days and during this period at night they also allowed the *shutki* to absorb adequate moisture from fog particularly during winter season. By this time the processors prepared their clay vats using fish oil. Vat was soaked adequately with fish oil before packing the dried fish inside it. Generally it took 4-7 days for soaking depending on the vat condition. After drying of *punti shutki* for 10-12 days, they were allowed to wash for at least 30 min in tube well water to remove the dust from the fish body and the dried products were kept overnight on a bamboo made *chatai* or basket for absorbing water. When fish flesh became soft and slimy then the *shutki* were kept ready to pack into the prepared vat by pressing. The vat was allowed to be packed tightly

by pressing until it was filled up to the rim. The remaining parts in the mouth of the vats were usually filled by pasting with ground *shutki*. Then the mouth of the vat was covered by polythene and plastered by heavy layer of clay to create anaerobic condition and to accelerate the fermentation process. The sealed vat was kept in a room for a period of 4-6 months. After this period the product is ready for consumption.

Quality aspects of dried *punti* and *chepa shutki*

The survey reveals that both qualitative and quantitative losses amounting 20-30% occur with the dried product through spoilage and insect attack during and after drying. Reza *et al.* (2005) also observed similar amount of losses of dried fish products in Cox's Bazar and Chittagong regions of Bangladesh.

Table 2. Quality aspects of dried *punti* and *chepa shutki* products from producer, wholesale and retail markets of Mymensingh region

Products	Peak period of production	Storage duration	Chemicals/preservatives used in storage	General sanitation and hygienic condition of store room	Organoleptic quality	Overall quality
<i>Punti shutki</i> from producer	Nov.- March	Stored in bamboo basket for at least 1 month	No chemicals used except salt water (500g NaCl in 1 liter) as preservative	Very good; products are kept under bamboo mats in dry and cool environment, protected from blow fly infestation	Very attractive shiny colour, good fishy odour, no infestation by blow fly larvae	Excellent
<i>Punti shutki</i> from wholesaler	-	3-5 weeks	No chemical used	Not good; products kept in gunny bags, bamboo basket without wrapping. No protection against fly	Brownish to dark brown colour, infestation by blow flies, beetle where fungal growth is common	Not good
<i>Punti shutki</i> from retailer	-	4-8 weeks	No chemicals used except salt water (500 g NaCl in 1 liter) as preservative	Not good, products are kept in bamboo/plastic basket/wooden box with or without polyethylene or jute sack wrapping	Brownish to dark brown colour, infestation by blow fly, beetle and fungal growth are common	Poor
<i>Chepa shutki</i> from producer	Nov.- March	3-4 month	No chemicals is used, fish oil used as preservatives	Very good quality; products stored in clay vats in a dry, cool and dark room. Sometime vats are kept underground	Bright shining blackish to yellowish colour, firm and flexible texture, soft and spongy flesh	Excellent
<i>Chepa shutki</i> from wholesaler	-	4-6 months	No chemicals is used	Good quality; products stored in clay vats, bamboo basket etc. Proper hygienic environment not maintained	Dull appearance, gray yellowish color, slight off odour	Good
<i>Chepa shutki</i> from retailer	-	4-6 months	No chemicals is used	Not good; products kept in bamboo/plastic basket/wooden box/clay vat without wrapping, flies are frequent on the products	Dull appearance, color become fad and some whitish, faint sour odour and malting flesh	Poor

In the study areas, overall quality of the dried *punti* and *chepa shutki* products collected from various stages of marketing channel were judged by using different point and score (Table 2). The products obtained from producer had bright and shining appearance, shining blackish to yellowish colour, characteristics good odour, firm and flexible texture and soft and spongy flesh. The overall quality of the product was graded excellent quality. On the other hand semi-fermented product obtained from wholesale had slight dullness appearance, gray and

yellowish colour, slight of sour odour, firm and flexible texture and very soft flesh. The overall quality of the product was graded as acceptable condition for consumption. *Chepa shutki* obtained from retailer had dull appearance with faded whitish colour, faint sour odour and limp and floppy texture. The abdomen flesh of the product obtained from retailer was very soft (melting abdomen) and loss of water absorption capacity. This product was considered as very poor in quality and graded as not suitable for consumption.

Chepa shutki is an old traditional product of Bangladesh. The loss of quality that occurs in different stages of handling and marketing channel can easily be prevented by creating awareness among different parties involved in the production chain. Government and other agencies can take necessary steps to disseminate adequate knowledge about the quality aspects and improve the marketing channel for safe and steady supply of different traditional fishery products to the common people of Bangladesh.

References

- BOBP (Bay of Bengal Programme) 1985. Marine small scale fisheries of Bangladesh: a general description, Madras, FAO Bay of Bengal Programme IV, p. 59.
- Khanum, M.N., Takamura, H. and Matoba, T. 1999. Nutritional Composition of a Semi-fermented Fish Product (*Chapa Shutki*) in Bangladesh. *Journal of Home Economics of Japan* 50: 703-712.
- Mansur, M. A. 2007. A review of different aspects of fish fermentation in Bangladesh. *Bangladesh J. Prog. Sci. & Tech.* 5: 185-190.
- Nurullah, M. 2005. Quality assessment and improvement of traditionally dried small indigenous fish of Bangladesh. Ph.D. Thesis. Department of Fisheries Technology, Bangladesh Agricultural University, Mymensingh, Bangladesh. 184p.
- Reza, M. S., Bapary, M. A. J., Azimuddin, K.M, Nurullah, M. and Kamal, M. 2005. Studies on the traditional drying activities of commercially important marine fishes of Bangladesh. *Pakistan Journal of Biological Sciences* 8: 1303-1310.