

## Traditional Smoked Shrimp Products and Socio-economic Condition of the Fishing Community

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### Abstract

A detailed survey was conducted on September 2007 on the present status of smoked shrimp production and marketing in coastal village of Paikgacha, Khulna, through interview with cross section of people engaged in smoked shrimp production and marketing. This study was undertaken for exploring the processing technique of traditional smoked shrimp products and the socio-economic condition of the coastal people involved in this activity. The present study reveals that the livelihood status of the most smoked shrimp producers are below poverty level. They are illiterate and are not aware about the quality aspects particularly on hygiene and sanitation of smoked shrimp products. The overall quality of the traditional smoked shrimp products including processing, handling, packaging and transportation in the markets is very poor. So, efforts should be made to remove problems for building up an ideal shrimp smoking and marketing system.

**Keywords:** *Traditional, smoked shrimp, fishing community, coastal region*

### Introduction

Smoking is a preservation process combining drying and the deposition of the constituents produced by the thermal deposition of the organic materials, usually wood of some type (Wheaton and Lawson, 1985). Smoking of mixed small shrimp is widely and popularly practiced in coastal regions of Khulna, Cox's Bazar and Sundarban especially in the rainy season when the catch of small shrimp is very high. For small shrimps, smoking is a good technique for preservation and is being used due to no other alternative methods available in rainy season (Hoq *et al.* 2006). Thermal cracking of wood under reduced oxygen supply results in smoke containing several compounds. Curing of fish and shrimp by smoke imparts a characteristics

flavour. In modern times, smoking is practiced not necessarily to obtain desirable colour and flavour, but mainly to accelerate the drying of fish (Clucas and Ward, 1996). The property of smoked shrimp depends to a large extent on the type of wood from which it is produced. The gas phase contains several flavour-producing agents, aliphatic and aromatic, numbering over 200. The smoked shrimp products available in the retail market are not of satisfactionable quality. For transportation smoked shrimp is generally packed in special cylindrical basket made of reed stems and marketed in bamboo basket. The mode of transportation and storage supports microbial spoilage which may deteriorate the quality of the products (Hoq,

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2002). Bacterial spoilage in smoked product is mostly due to presence of non-spore forming rod which is likely to be introduced during handling of the product (Graikoski, 1973). After all, the people involved with the production, marketing and transportation of smoked shrimps are not aware about health, sanitation and product quality. They are illiterate and live below poverty level.

There has been very little report on the smoked shrimp producers and smoking process of shrimp in Bangladesh. Considering the above facts the present study was undertaken to study the socio-economic condition on production and marketing of traditional smoked shrimp products in coastal (Khulna, Paikgacha) region.

## Methodology

A detailed survey has been conducted to investigate and gather information about traditional smoked shrimp produced in Khulna region. In order to collect information on the production and marketing systems of traditional smoked shrimp, the area of the smoked shrimp production in Paikgacha was selected and data was collected randomly from 17 producers. The

data were collected using prescribed questionnaire prepared by the Department of Fisheries Technology, Bangladesh Agricultural University, Mymensingh, through interview with the owners and persons involved in smoking kiln (*Locally called Khuittya*). The survey was conducted on 10<sup>th</sup> to 13<sup>th</sup> September, 2007.

## Findings and Discussion

### Processing techniques of traditional smoked shrimp products

In Paikgacha, the smoked shrimp producers operate their activities all over the year except the months from November to January due to shortage of raw materials. The smoking activities are closely related with the lunar cycle as the lunar cycle determines the availability of shrimps. The smoked shrimp producers operate smoking process 12 days per month, 6 days during full moon and 6 days during new moon as the shrimps are captured hugely. Comparatively, shrimps are more abundant in full moon tide than new moon tide. About 20-30% of the shrimps caught in coastal region are used for smoking purpose. The smoked shrimp producers in Paikgacha use three species of shrimps, locally called Horina (*Metapenaeus*

*monoceros*), Chali (*Metapenaeus brevicornis*) and Chaka (*Penaeus indicus*). Sometimes they produce smoked shrimp by using mixed species.

A brief description of processing method of traditional smoked shrimp practiced in Paikgacha is described below:

### Collection of raw material

Small shrimps are bought in the landing site by auction and are brought in the processing site. The shrimps are sorted out putting them on polyethylene sheet. The white shrimps are mostly caught from "Gher" together with bagda species. Some are also caught from rivers, estuaries and even from mangroves. Three species of shrimps are widely used for smoking, those are Horina, Chali and Chaka.

### **Sorting**

After collection, the unwanted substances such as foreign particles like leaf-fragments, mollusk shell, other fish and shrimp species are removed.

### **Washing**

The raw materials are washed in tidal water using bamboo made basket by sinking the basket underneath the water.

### **Draining**

After washing, the baskets are allowed to drained off water

### **Spreading on the mat**

Then the shrimps are spread over the small meshed bamboo racks under the cover shed and flame is produced underneath the racks. Mainly Shundari (*Heritiera fomes*), Goran, Bel (*Aegle marmelos*) etc. timbers are used for producing fire and burning.

### **Closing of ventilation**

After spreading the shrimps, all the ventilations are closed to trap the smoke and temperature.

### **Smoking**

A slow burning of wood produces much more smoke than an intense fire (Tilgner *et al.*, 1962). So, soaked plant wood is used for fire and smoke production. During smoking, using a thin bamboo split, the shrimps are turned into different directions carefully after every 2-3 hours. Smoking is done about 6-7 hours, and during this period a very bright red color develops in the products.

### **Cooling and packaging**

After smoking, the products are allowed to cool for 6-8 hours and packed in special baskets made of a plant leave (Hogla leaves).

### **Sanitation and hygiene of smoked shrimp producers**

The smoked shrimp producers are not aware of all about sanitation and hygienic requirement for producing high quality smoked products. The entire working environment is dirty and the personnel associated with the activities are not aware about the personal hygiene and sanitation. Some features of the health and sanitation condition are given below:

- Sometimes, the producers use very poor quality shrimp as those are not sold in the fresh market. They mix small size shrimp with the desirable size to get more benefit and they never use ice for temporary preservation before being used for the production of smoked shrimp.
- The area around the smoking yard is very dirty and dump.
- The shrimp is washed by very dirty tidal water which may contain harmful bacteria, sand particles, filth, heavy metals, chemical substances and harmful pesticides.
- The bamboo mesh racks used for smoked shrimp production is not cleaned and white fungal colonies are grown over the rack.
- The personal hygiene and sanitation condition of workers involved in smoked shrimp production are alarming.
- The smoked shrimps are packaged in special cylindrical baskets made of reed stems, which allows the absorbance of moisture and damage the final product quality.



Plate 1. The entering path of a smoked shrimp producing house



During high tide



During low tide

Plate 2. The shrimps are washed in tidal dirty water

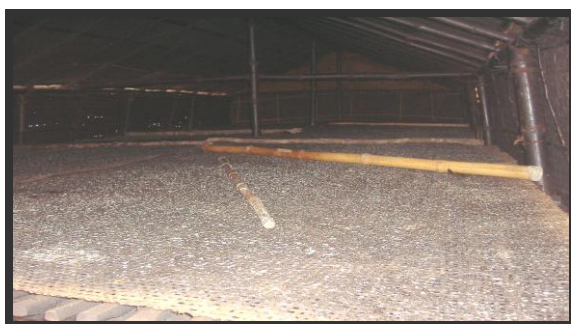


Plate 3. Whitish fungal colonies are spread over the bamboo rack



Plate 4. The unsanitary water is used for washing shrimps and soaking logs



Plate 5. Hogla leave made basket is used for packaging of smoked shrimp

### Marketing chain of smoked shrimp products

Most of the smoked shrimp products are consumed in the domestic market of Khulna and Chittagong. There is no report of exporting smoked shrimp products in foreign countries. Some people produce smoked products for household purpose and the rests are produced for selling in local markets. The smoked shrimps produced in Khulna-Paikgacha region are transported to wholesale market of Chittagong by truck. From the wholesale market, the smoked shrimps are transported to the retail market for local consumption. Visiting was done to different marketing chains from producers to retail markets to collect information about the quality of traditional smoked shrimp products. The product quality varied from producers to retailers and the results are summarized and presented in Table 1. The smoked shrimp products are mostly available during the rainy season which is the peak season of traditional smoked shrimp production in Bangladesh. The storage

duration of traditional smoked shrimp products varies from 2-3 months depending on the storage condition, environment and quality of the product. The retailers usually store the product until it is not sold completely. From the survey in marketing system, it indicates that the quality of the smoked shrimp products reduces with the time lapse in marketing process. On storage the fresh aromatic smoke flavour of newly cured fish becomes weaker, blander or unpleasant nature (Connel, 1995). In different marketing chains, proper care is not taken to keep the quality of their products. The packaging materials used is air permeable which allows the products in up taking the atmospheric moisture. As a result, the products absorb moisture resulting hydrolysis and oxidation of lipids. The high moisture content also induces microbial growth. Thus, the smoked shrimp products losses quality within very short storing period. The producers keep the products very short time and they deliver the products as early as possible.

Table 1. Survey results on the condition of smoked shrimp in different stakeholders

Sl. No.	Stake holders	Holding time (Days)	Keeping method/ Hygienic condition for storage	Organoleptic quality	Overall quality
1.	Producers	2-10	Hogla plant made baskets are used which is not good for storage. The storage room is dam and insect accessible	Bright red colour with strong smoky sweet odour and stringy, fragile texture	Good
2.	Wholesaler	15-30	Shrimps are kept on hogla plant made basket/ on open floor. Not good for the products. The storage room is dam and insect accessible	Reddish colour with mild smoky odour fragile texture	Less than good
3.	Retailer	5-30	Not good, products are kept in dam and air permeable basket made of hogla, bamboo or gunny bag.	Dark to whitish red colour with neutral odour rancid off odour and mostly soften and elastic texture	Poor

They pack the products by using the basket made of hogla. They store the products less than a week and the product quality is more or less in good condition and acceptable for consumption. The product shows original characteristics of bright red colour with strong smoky sweet odour and stringy, fragile texture. In the wholesale market, the products are stored on hogla plant made basket/ on open floor which condition is not good for maintaining the keeping quality of the products. The storage room is dam and the products are seen infested with insects. Some losses of quality of the products appeared with reddish colour, mild smoky odour and fragile texture. The quality and storage conditions in retailer market are very poor. The smoked shrimps turns into dark to whitish red colour with loss of neutral odour, rancid off odour and mostly soften and elastic texture.

### **Socio-economic condition of smoked shrimp producers in Paikgacha region**

During the survey, information on the socio-economic condition of the smoked shrimp producers was also collected and the result is presented in Table 2. Data were collected from 17 families who were actively involved with the production of smoked shrimp. They were selected randomly from the village of Paikgacha area. Smoked shrimp production was the principle source of income in rural people of that region. The business was operated by two ways on the basis of ownership of business, self and non self. About 82% of the producers operated their operation by themselves. The other 18% of the producers were not directly involved with the smoking process, they invested capital and employed labour for smoking shrimp production. Only 6% percent of the smoked shrimp producers had less then 5 family members and 12% of the smoked shrimp producers had above 8 family members.

Most of the smoked shrimp producers (82%) had family members of 5-8. From the survey it revealed that about 71% of the respondents among the smoked shrimp producers were illiterate. They could not read or write and had little or no idea about personal hygiene. About 24% of them possessed primary level of education i.e. they could at least read or write and had little conscious in maintaining hygienic condition in smoked shrimp production. Only 5% of the respondent had their education level up to class X and they had adopted the profession as a means of only income generating activity and leading their livelihood with smoking activities. About 59% of the houses of smoked shrimp producers were made of bamboo and golpata. Only 6% had tin shed building and the rest 35% lived in tin built house. Majority of the smoked shrimp producers maintained their family with their existing income from smoked shrimp production. About 59 % of the producers had no alternative income and 29% earned their 25% income from other income generating activities. The health care facilities of the smoked shrimp producers were not satisfactory. They were deprived of modern medical treatment facilities. About 64% of the smoked shrimp producers took health care from village doctors, only 12% got their treatment in Govt. hospital and 24 % from Rural health complex. About 64% smoked shrimp producers lived without electricity facilities. The availability of safe potable water was a crucial need for the smoked shrimp producers. There was no adequate source of potable water in that region. About 76% of the people drank shallow tube well water though there was risk of arsenic contamination. The rest 24% of the people had no tube well and they had to drink the water of ponds, ditches or river with severe risk of health. The people were not aware about health and hygiene. Only 29% of the people used sanitary latrine, the

rest 71% used unsanitary latrine as a result they frequently suffered from intestinal diseases. The survey also showed that 53% of the retailers were satisfied with their existing social status and they ranked themselves in the society as businessmen but 29% of the respondents were not satisfied with their position in the society and felt

inferior in terms of social status. The people didn't have the facilities of modern entertainment. Nobody had facilities to watch television though large percentage of the people, 53% had facilities of listening radio. The rest of the people had some facilities to participate in local cultural programs.

Table 2. Distribution of shrimp producers on the basis of their socio-economic condition

Socio-economic parameters		Respondent	Percent (%)
Ownership of business	Self	14	82
	Not self	3	18
Family size	Less than 5	1	6
	5-8	14	82
	Above 8	2	12
Level of education	Illiterate	12	71
	Primary level	4	24
	High school	1	5
House build	Tin shed building	1	6
	Tin and wood built, earthen floor	6	35
	Bamboo, golpata	10	59
Income source	Solely from this business	10	59
	75 % from this business	5	29
	50 % from this business	2	12
Health care facilities	Govt. hospital	2	12
	Rural health complex	4	24
	Village doctors	11	64
Electricity availability	Present	11	64
	Absent	6	36
Sources of drinking water	Ponds/ rivers	4	24
	Shallow tube well	13	76
	Deep tube well	Nil	
Latrine	Sanitary	5	29
	Unsanitary	12	71
Entertainment	Television	Nil	
	Radio	9	53
	Local cultural programme	8	47
Opinion about social status	Satisfied	9	53
	Not satisfied	5	29
	No comment	3	18
Concept about dowry payment	Practice dowry payment	10	59
	Not practiced	4	24
	Dislike	3	17
Savings status	Practiced	4	24
	Not practiced	13	76

The smoked shrimp producers suffered from dowry payment as most of them had tendency of giving or receiving dowry. Among the respondents about 59% of the people had practiced dowry payment in their own or children marriage. Among the respondents 24% had not practiced this but they were not aware about the bad effect of dowry and they may practice this. But, the

rest 17% had strong argument against dowry payment, they hated the system and they would not practice this. The smoked shrimp producers were not well-off to have sound savings. Only 24% saved a little amount money through co-operative society. The rest 76% didn't think about savings as they may do this due to lack of deficiency or of tendency.

## Conclusions

The production of smoked shrimp is widely practiced in coastal region of Bangladesh but the production lacks proper scientific and hygienic procedures. The smoked shrimp products are processed by traditional method. The manpower involved in smoked shrimp production is not institutionally trained but they attained the skill through working experience. The people associated with smoked shrimp production and marketing is very poor and deprived of modern facilities

of living. This study was aimed at drawing public consciousness and attention about the production and marketing of smoked shrimp. Though smoked shrimp is a nutritious and tasty product, most of the countrymen are not introduced with this. So, the study was fruitful for the extension of the knowledge of smoked shrimp products among the people and to flourish the smoked shrimp production and trading with maintaining the desirable quality and safety.

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