

BASELINE SURVEY ON EXISTING STATUS OF FRIED POTATO CHIPS FROM PROCESSING TO MARKETING IN SELECTED LOCATIONS OF BANGLADESH

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Abstract

The baseline survey was conducted with a view to generate information on existing status of fried potato chips from processing to marketing in selected locations of Bangladesh. The baseline information was collected from seven selected districts namely Dhaka, Gazipur, Tangail, Mymensingh, Bogura, Munshigonj and Jashore. Fifteen hawkers and five producers were randomly selected to collect the information by the pre-tested questionnaire from each location both from producer to consumer. Most of the hawkers of Bogura was above 40 years old (80%) followed by Dhaka who were 25-39 years old (60%). In Bangladesh, eighty percent people were above 40 years old engaged in processing fried potato chips. All aged people in Bogura preferred fried potato chips (100%) whereas maximum child in Jashore (80%) liked fried potato chips. Bogura and Munshigonj people were unknown about healthiness knowledge of fried chips consumption. Bogura, Jashore and Munshigonj processors/producers were hawkers and they prepared the product and distributed the products to the market or direct involved in sale. Fried chips processing people in the survey area used deep frying technique (100%). Soya bean oil used for deep oil frying of potato chips by 80% small processors. Most of the respondents changed their frying oil during frying when frying oil turned into cloudy.

Keywords: Fried chips processing, frying techniques, marketing and distribution channel.

Introduction

Fried chips are a kind of mouthwatering food. It is a snacks food that was introduced for the first time in our country in the decade of eighty's. Initially, the market of the product was very small. However, in course of time the size of the market has been expanded significantly. Now there is a widespread market of chips in Bangladesh. Most of the people like to consume fried chips item commonly potato chips during travelling. Potato chips have been popular salty snacks for 150 years, and retail sales in the USA are worth about \$6 billion/year, representing 33 percent of the total sales of this market (Clark, 2003; Garayo and Moreira, 2002).

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Children are the potential consumers of potato chips. However, chips are equally liked by people of different ages. In Bangladesh most popular chips available in the market are real potato chips and potato crackers. Frying is a common cooking method with a wide range of applications all over the world. In the frying process, product is immersed in pre-heated oil at certain temperature level being far above the boiling point of water. Here water movement throughout the solid matrix occurs with accompanying oil absorption and product is removed from oil when color and textural characteristics meet the sensorial expectations (Medina *et al.*, 2015). This oil absorption is crucial parameter, since high amount of fat intake is known to potentially cause disorders such as coronary heart disease, diabetes (Saguy and Dana, 2003). Therefore, people are willing to consume low-fat products.

Chips is fried with deep oil at between 160° and 180°C is characterized by very high drying velocities, which are critical to improve not only the mechanical but also the structural properties of the potato chips (Baumann and Escher, 1995). The quality criteria of potato chips especially color is very important (Marique *et al.*, 2005) to the consumers, which is critical in the acceptance of the product (Pedreschi *et al.*, 2006).

Acrylamide is formed in potatoes generally in higher frying temperature (150 – 180° C) which is highly related to the color of potato chips that is suspected to have critical implications for human health because of carcinogenic substance possible existence in the product (Pedreschi and Zuniga, 2009, Pedreschi and Moyano, 2005). Potato chips color is affected by the Maillard reaction resulting of reducing sugars, amino acids, or proteins at the surface. It is also affected by the frying temperature and time (Marquez and Anon, 1986).

There is no information documented regarding the fried chips processing to marketing in our country. In this regard, the baseline survey was conducted in the selected location of Bangladesh to generate information on fried potato chips from processing to marketing aiming the following objectives:

1. Generation of information on the locally available fried potato chips in Bangladesh
2. Evaluation of frying technique, marketing, distribution channel and consumers preference of the product.

Materials and Methods

Questionnaire development and conducting the baseline survey

A detailed survey questionnaire was prepared with the assistance of the Agricultural Economics Division of Bangladesh Agricultural Research Institute

(BARI), Gazipur. The questionnaire was segmented into two types (Based on Hawkers and based on Producer) to facilitate the data collection and to get the entire information from the selected location. Then, it was pre-tested in the selected project areas. The baseline information was collected from seven districts namely Dhaka, Gazipur, Tangail, Mymensingh, Bogura, Munshigonj and Jashore. Fifteen hawkers and five producers were randomly selected from each locations to collect the information by the selected questionnaire. During the survey the complete data from producers to consumers was collected (Figure 1). The information on selling pattern viz., selling area, retail price, profit, selling time etc. were collected. The processing pattern with their frying practice parameters such as frying technique, frying oil type, frying temperature & time, raw materials, packaging, storage etc. were recorded during the survey. Both hawkers and producers based questionnaire covers all qualitative and quantitative data, which covers both processing methods and marketing channel with their profit and popularity group of the consumers.

Data collection and data analysis

The collected information was organized in tabular form by using MS Excel data sheet and then analyzed. MS Excel was used for statistical analysis, which provided different information from fried potato chips processing to marketing status. The information also represented different comparative study among the parameters.

Results and Discussions

Baseline survey

In Bangladesh, potato chips and extruded products (crackers) are available commonly in urban areas. During the survey with the help of pre-tested questionnaires (producer based and hawker based), the complete data from producer to consumer was collected from the selected locations.

The baseline information was collected from seven districts namely Dhaka, Gazipur, Tangail, Mymensingh, Bogura, Munshigonj and Jashore. The information was accumulated from the respondent of different locations (such as school, park, highways, bus, train etc.). Selling pattern (selling area, retail price, profit, selling time, consumer level etc.) and the processing pattern with their frying practices such as frying technique, frying oil type, frying temperature & time, raw materials, packaging, storage etc. were also collected.

The collected baseline general information was analysed and shown in Table 1. It was observed that most of the Hawkers were aged between 25-39 years.

However, in Gazipur and Mymensingh region some hawkers were below 17 years old. In case of producers, the age groups were above 40 years and 25-39 years old. In Munshigonj 100% producers were in the age group of 25 – 39 years and in Bogura 80% were age group above 40 years where most of them were illiterate. Similar trends were noted in Munshigonj where the producers' education level is under class V. Due to illiteracy they had no knowledge about the product quality maintenance during processing to marketing.

In Table 2 it was observed that the Hawker of Bogura, Jashore and Munshigonj processors/producers were Hawkers and they prepared the product and distributed the products to the market or directly involved in sale. It might be happen because of being a huge quantity of production in those areas. However, the Hawkers of Tangail area collected almost all potato chips from the wholesalers. Similar information were noticed in Gazipur, Dhaka and Mymensingh areas. In Jashore, Munshigonj and Dhaka hawkers (60 – 100%) earned above 500 Taka profit per day to sell potato chips and Gazipur (40%) and Mymensingh (50%) hawkers had profit 350-500 Taka per day. Medium profit/day (201 - 349 Taka) was achieved by both in Bogura and Tangail Hawkers (60%). Both in Bogura and Munshigonj Hawkers had no idea about the product healthiness but most of Dhaka and Jashore Hawkers were known about potato chips processing in hygienic condition because of maintaining product quality and safety issue. In the study area most of the potato chips consumers were all ages except in Jashore was observed 80% child preferred potato chips (Table 2).

The result presented in Table 3 shown 100% producers of Bogura, Mymensingh, Jashore and Munshigonj used deep frying technique and more than 50% small processors prepared potato chips into deep oil frying with soya bean oil. Some processor used mixed oil as soybean and palm oil together. Most of respondents (>80%) of those locations changed oil during frying of potato chips when frying oil turned into cloudy and 17 to 20% respondent changed frying oil when perceived smelt burn during frying. Hundred percent respondent did not know frying oil temperature during processing of fried chips. Frying temperature influences product quality with safety assurance. Most of them determined the oil quality by observing oil color during frying where oil temperature is the most concerning factor to reduce the acrylamide content in the fried products. Product fried into deep oil at higher temperature may be a possibility to contain acrylamide substance, which is carcinogenic element (Pedreschi and Moyano, 2005). Most of the producers of potato chips processing counted frying time as per product crispiness except the study area of Mymensingh. In that area, product color change is an important indicator to evaluate the frying completion time.

Table 1. General information of fried potato chips collected from Hawkers and Producers level

Particular	Hawkers based (%)							Producers based (%)			
	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	B ₁	B ₂	B ₃	B ₄
A. Age Group											
Below 17 year	53.33	-	-	37.50	-	-	-	-	-	-	-
18-24 year	6.67	20.00	40.00	25.00	-	-	20.00	-	-	-	-
25-39 year	40.00	60.00	40.00	12.50	20.00	80.00	80.00	60.00	20.00	60.00	100.00
40 above	-	20.00	20.00	25.00	80.00	20.00	-	40.00	80.00	40.00	-
B. Education Level											
Illiterate	73.33	30.00	60.00	62.50	80.00	20.00	100.00	60.00	80.00	60.00	66.66
Class I-V	26.67	30.00	40.00	37.50	20.00	20.00	-	40.00	20.00	40.00	33.33
Class VI-X	-	40.00	-	-	-	60.00	-	-	-	-	-
SSC	-	-	-	-	-	-	-	-	-	-	-
HSC	-	-	-	-	-	-	-	-	-	-	-

Note: Hawkers based (A₁-Gazipur; A₂-Dhaka; A₃-Tangail; A₄-Mymensingh; A₅-Bogura; A₆-Jashore; A₇-Munshigonj; Producers based (B₁-Mymensingh; B₂-Bogura; B₃-Jashore; B₄-Munshigonj).

Table 2. Hawker based information of fried potato chips collected from selected project locations

Study area	Product collection (%)		Profit/day (%)				Knowledge about healthiness (%)				Consumer (%)		
	Own making	Wholesaler	Low	Medium	High	High-est	Healthy	Un-healthy	No Idea	Child	You-ng	All Ages	
Gazipur	13.33	86.67	26.67	20.00	40.00	13.33	26.67	6.66	66.67	20.00	-	80.00	
Dhaka	30.00	70.00	-	20.00	20.00	60.00	70.00	-	30.00	40.00	-	60.00	
Tangail	-	100.00	20.00	60.00	20.00	-	20.00	-	80.00	20.00	-	80.00	
Mymensingh	37.50	62.50	-	25.00	50.00	25.00	25.00	-	75.00	25.00	-	75.00	
Bogura	100.00	-	20.00	60.00	20.00	-	-	-	100.00	-	-	100.00	
Jashore	100.00	-	-	-	-	100.00	60.00	-	40.00	80.00	-	20.00	
Munshigonj	100.00	-	-	-	20.00	80.00	-	-	100.00	20.00	20.00	60.00	

Note: Profit ranges category: Low=150-200 Tk/day; Medium= 201-349 Tk/day; High=350-500 Tk/day; Highest=above 500 Tk/day

Table 3. Producer based information of fried potato chips collected from selected project locations

Study area	Study parameters											
	FT used by small processors (%)			Different frying oil used small processors (%)			Respond on oil temperature (%)		Respond on oil change condition (%)		Respond on frying completion time (%)	
	DF	VF		SO	PO	MO	Known	Unknown	Cloudy	Smelt burn	Color change	Crispiness
Bogura	100	-	80	20	-	-	100	100	80	20	20	80
Mymensingh	100	-	80	-	20	-	100	100	100	-	60	40
Jashore	100	-	50	-	50	-	100	83.33	16.66	33.33	66.66	66.66
Munshigonj	100	-	100	-	-	-	100	80	20	20	80	80

Note: FT-Frying technique; SO-Soya bean oil; PO-Palm oil; MO-Mixed oil; DF-Deep frying; VF-Vacuum frying

Marketing and distribution channel

In Bangladesh, locally available potato chips distribution from producers to consumers comprises of producers, wholesaler, retailers/hawkers and consumers. In this product distribution structure, the processors/producers are most powerful as the entire distribution channel is dependent on them. Sometimes producers work as wholesalers and even they directly distribute the products to the consumers. From the survey, it is observed that in the direct distribution system of the product from producers to consumers they get the highest profit comparatively (Table 2). Retail hawkers also collect the products from processors and distributes to the consumers. However, they get the limited profit. Generally, middleman adds the products distribution cost and lowers the profits. As the locally available potato chips in Bangladesh are shorter shelf life generally used to market within a shortage period of storage (within 2-3 days). In Dhaka and Gazipur, retailing hawkers to consumer's product distribution system is commonly practiced. However, except Dhaka and Gazipur other processors as well as wholesalers directly distributes the potato chips directly to the consumers. The flow process of the marketing channel of the locally available potato chips in Bangladesh is given below (Figure 1):

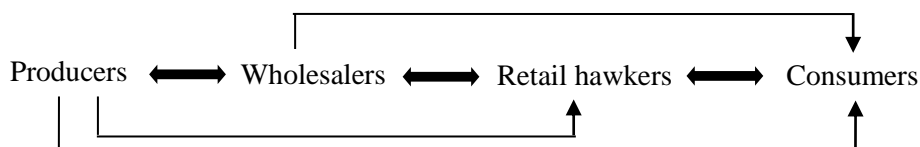


Figure 1. Flow diagram of locally available potato chips marketing and distribution channel

Conclusion

The baseline survey conducted in selected locations represents the information regarding available fried potato chips from processing to marketing in Bangladesh. Most of the producers and hawkers involved in fried potato chips processing are illiterate and they are unconcerned about proper processing technique in hygienic condition, which is associated with food safety issue as well as to secure food products for human health. Potato chips processors also do not have hands on training with knowledge for fried chips processing techniques as well as to maintain product quality. Finally, it can be concluded that appropriate processing practice for quality-fried chips is necessary to ensure safe food products for the consumer's consumption.

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