

## Original Research Article

# Health, Hygiene Practices and Safety Measures of Selected Baking Factories in Tangail Region, Bangladesh

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## A B S T R A C T

Food safety and hygiene is very important area in any food industries especially bakery industries as it incorporates a lot of raw ingredients. A cross sectional survey was conducted among the selected three local bakery industries at Tangail Sadar areas, Bangladesh to know the health, hygiene practices and safety measures of those factories. All of these were small and medium entrepreneurs and the total number of employee was very limited, F A Food products had maximum 100 employees where as Bornali Bakery had only 36 employees. Housing infrastructure of the selected factories was not well recognized but the F A Food products surroundings wall and floor was comparatively better than other two factories. Conditions of the machine room, packaging, sealing room and surrounding of selected factories were also not satisfactory level. Toilet facilities of both male and female workers were also not highly satisfactory level as only 33% of the respondents were given good comments about toilet facilities. Practice of wearing aprons & caps by personnel of the considered factories were not satisfactory level, two factories had no provision of wearing aprons & caps for supervisory staff. All the local bakery factories had no proper monitoring system for hygiene practices. Only one industry had fire prevention facilities in a limited ways but none industry had accident prevention in the building. Thus a combined quality management system is necessary for the development of comprehensive control procedures of those factories.

### Keywords

Bakery, safety and hygiene, packaging and sealing.

## Introduction

Food safety is an increasingly important public health issues. Governments of all

over the world are intensifying their efforts to improve food safety. These

efforts are in response to an increasing number of food safety problems and rising consumer concerns. Food borne diseases are a widespread and growing public health problem, both in developed and developing countries. Food contamination creates an enormous social and economic burden on communities and their health systems.

Food safety and hygiene is very important area in any food industries. Food factories has to keep basic good house keeping and hygiene standards as any lack in this area would result in very poor performance of the business . This is also important as the consumers are very sensitive to foreign body complaints or anything which might affects individual health. Some governments has imposed very strict quality parameter for ingredients and their storage practices.

Food safety has been regulated since the mid-1800s and was mostly the responsibility of local and state regulators. However, the Pure Food and Drugs Act, passed by Congress in 1906, marked the first major federal consumer protection law with respect to food processing. The 1906 law prevented interstate and foreign commerce in misbranded or adulterated foods, drinks, or drugs. The intent of the Act was to prevent poisoning and consumer fraud (Barendsz, 1998).

Food hygiene practices are encouraged to be strictly followed by food manufacturers in producing their food products as such practices prevent unhealthy and unhygienic conditions during production operations. They also provide good guidelines, understanding and raises awareness of the standards needed to be observed in food processing by manufacturers and their employees. These

in turn are important so as to gain, raise and maintain consumer confidence and eventually will then bring in product acceptability and profits. The GMP regulations were finalized in April of 1969 and published as Part 128 of the Code of Federal Regulations (CFR). In 1977, Part 128 was recordified and published as Part 110 of the CFR (Damman, 1999).

Food safety in bakery industry has certain features which are different from other food factories. As consumers have become educated on food safety standards and health safety, Governments have responded with more laws on food safety .It would be highly recommended that bakery manufacturers invest good amount of funds to the food safety equipments and measures.

To handle these issues International standards are being followed. Companies have opted for HACCP certification. Important Food safety consideration for any bakery manufacturers are: Laws and regulations / Vendors selection for raw materials /Food safety plans / Traceability / Recall plan / Documentation /Audits and inspection (Evans and Lindsay, 1996).Food safety in bakeries can be achieved through Good Manufacturing Principles (GMP) and Good Hygiene Practices (GHP) (Hoogland ET AL., 1998). Each year, millions of consumers in Bangladesh succumb to foodborne illnesses as a result of consuming unsafe or contaminated food (Leaper, 1997).

Food manufacturers have to decide which QA system is most suitable to their specific situation and how this system should be implemented. In the food industry, a number of Quality Assurance (QA) systems are available like GMP (Good Manufacturing Practice), HACCP

(Hazard Analysis Critical Control Points), ISO (International Organization for Standardization) and the international technical standard of BRC (British Retail Consortium). These systems and their combinations are applied for assuring food quality (Surak and John, 2008):

GMP consists of fundamental principles, procedures and means needed to design a suitable environment for the production of food of acceptable quality (Frost, 2008). The basic aim of the GMP codes is to combine procedures for manufacturing and quality control in such a way that products are manufactured consistently to a quality appropriate to their intended use (DeMan and John, 1999).

HACCP is applicable to the identification of microbiological, chemical and physical hazards affecting product safety. It should only be applied to food safety but the technique can also be used to identify and control hazards associated with microbial spoilage and quality of products (Craun, 1986). There are about 700 recognized processed food manufacturing industries in this country and these include mostly processing of bakery, confectionery, fruits and vegetable, cereals, dairy, fish, carbonated and non-carbonated fruit juices, other beverages and various miscellaneous food processing enterprises. The aim of this study is to compare the health and hygiene practices and safety measures of selected baking factories in Tangail Sador district, Bangladesh.

## **Materials and Methods**

Among the nineteen small and medium baking factories in Tangail Sador areas three factories were purposively selected based on there similar in terms of products, factory location, establishing

year, organization structure and so on. Due to resource and accessibility constraints a limited number of factories were included as a small sample size.

During November, 2011 to April 2012 the selected food industries are F A Food Products, Nishat Food and Chanachur Industries and Bornali Bakery & Confectionary all are located at Tangail Sador.

## **Data collection procedure**

Consent will be taken from the factory fulfilling the eligibility criteria and agreeing to participate as indicated by signing on an informed consent form. Qualitative data was collected by interviewing the respected person involved in each section and self observation by the researcher.

## **Development of questionnaire**

An initial questionnaire was prepared based on the general objectives as well as specific objective. A pilot survey was done in a similar factory and later on after field test it has been finalized.

## **Data entry and analysis**

As soon as the data were collected, a suitable data entry software SPSS version 14.0 was used to record the data in a computer. Each subset of data were analyze separately with descriptive and logic. For tabular and graphical representation Ms. Excel program was used.

## **Results and Discussion**

The general information of the selected industries is specified in table-1. The

considered industries are F A Food Products (A), Nishat Food and Chanachur Industries (B) and Bornali Bakery & Confectionary (C) all are located at Tangail Sadar. They are all the private factories and their areas were only few decimals. The employees of the observed industries were very limited number. F A Food Products which is a big organization has the highest number of employees i.e., male 64 and female 36 person and Bornali Bakery and Confectionary is a small industry has the lowest number of employees i.e. male 21 and female 15 person. Other industry has total 40 employee.

Table 2 and 3 show the housing infrastructure and surroundings of the selected factories and observed that all the factories roofs was not well enough but the F A Food Products surrounding wall and floor is comparatively better than other two industries. The door, garbage system, approach road, ventilation and lighting arrangement were good category but the windows were not properly netted. As a result, flies and insects were entered in their production place. Furthermore table 4 shows the conditions of the machine room, packaging and sealing room of those factories. Nishat Food and Chanachur factories machine room and packaging room was comparatively wider than others. yet, sealing room in all factories was narrow and small.

Figure 1 shows the toilet facilities of both male and female workers were not highly satisfactory as it is the most important hygiene and sanitary practices considered in food factories. About one-third of the respondents were given good comments about their toilet facilities. The overall housing structure of these factories was shown in figure 2. The conditions of the

wall, roof, floor, the door, garbage system, approach road, ventilation and lighting arrangements were included the overall housing structure arrangement. In that case about 17% of their premises were poor quality and 67% had considerably well.

All persons working in direct contact with food, food-contact surfaces, and food-packaging materials shall conform to hygienic practices while on duty to the extent necessary to protect against contamination of food (21 CFR Part 110). Workers of my studied factories are abiding by hygiene practices in three different ways. One of the observed factory's workers show somebody are abiding by hygiene practices, in another factory everybody are abiding by hygiene practices.

Table 5 shows the comparisons of the presence of different committees and regulations presence in the factories and in that cases all the local bakery industries had no proper monitoring system for hygiene practices. At the same time two of the industries also absent the safety and monitoring committee, as a result the health care and hygiene practices of those industries was not satisfactory level.

Practice of wearing aprons & caps by personnel of the considered industries are given on the table 6. All industries show different results for both workers and supervisory stuffs concerning wearing aprons & caps and hand & mouth gloves. Only two industry don't have provision for wearing aprons & caps for supervisory staff, similarly another industry don't have a provision for wearing hand and mouth gloves for supervisor. Finally, in one industry we found that all the workers & supervisory stuffs wear aprons & caps and hand & mouth gloves during production

**Table.1** General Information of the selected Baking Factories

Factory Code*	Establishing Year	Types of Factory	Areas of Factory Premises	No. of Employee		No. of Products
				Male	Female	
A	2005	Private	20 decimal	64	36	10
B	2009	Private	4500 Squire Ft	22	18	6
C	1990	Private	7 decimal	21	15	8

\*A= F.A. Food Products Ltd., B= Nishat Food and Chanachur Ind., C= Bornali Bakery & Confectionary Ind.

**Table.2** Housing infra structure of the selected factories

Housing Structure	F A Food Products	Nishat Food and Chanachur Ind.	Bornali Bakery & Confectionary
Roofing	Fair	Fair	Fair
Wall	Good	Fair	Fair
Floor	Good	Fair	Fair

**Table.3** Conditions of the selected factories room and surroundings

Parts of Factories	F A Food Products	Nishat Food and Chanachur Ind.	Bornali Bakery & Confectionary
Doors	Good	Fair	Fair
Windows (with net)	Fair	Fair	Poor
Garbage System	Good	Good	Fair
Approach road	Good	Good	Fair
Surroundings	Fair	Fair	Fair
Ventilation	Good	Fair	Fair
Lighting Arrangement	Good	Good	Poor

**Table 4:** Conditions of the selected factories different rooms

Room	F A Food Products	Nishat Food and Chanachur Ind.	Bornali Bakery & Confectionary
Machine room	Wide	Wide	Narrow
Packaging room	Narrow	Wide	Narrow
Sealing Room	Narrow	Narrow	Narrow

**Table.5** Comparisons of the presence of different committees and regulations

<b>Presence of different committees and regulations</b>	<b>F A Food Products</b>	<b>Nishat Food and Chanachur Ind.</b>	<b>Bornali Bakery &amp; Confectionary</b>
Safety and monitoring committee	Present	Absent	Absent
Diseased personnel allow to work	No	No	No
Monitoring system for hygiene practices	Absent	Absent	Absent

**Table.6** Distribution of the worker & supervisory staff according to wear (apron, cap, hand & mouth gloves) in the industry

	<b>Workers wear apron &amp; cap (%)</b>	<b>Supervisory staff wear apron &amp; cap (%)</b>	<b>Workers wear hand &amp; mouth gloves (%)</b>	<b>Supervisory staff wear hand &amp; mouth gloves (%)</b>
<b>All section</b>	16.7	16.7	16.7	33.3
<b>Some section</b>	<b>83.3</b>	<b>50</b>	33.3	0.0
<b>No</b>	0	33.3	<b>50.0</b>	<b>66.7</b>

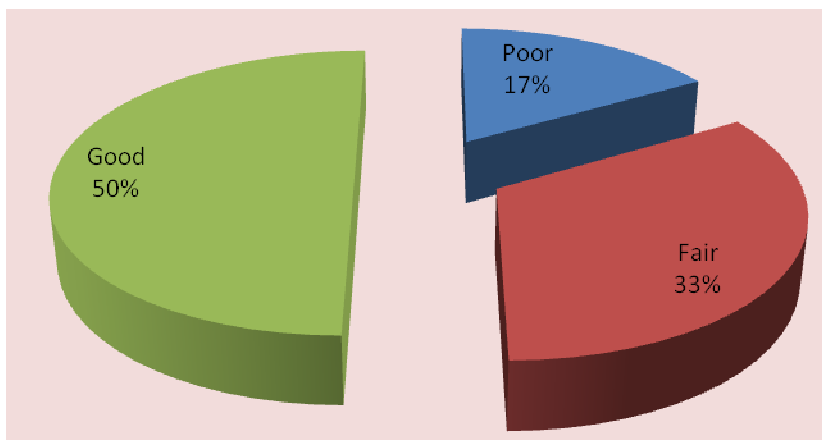
**Table.7** Conditions of the Presence of safety measures and facilities in Industries

<b>Safety measures and facilities</b>	<b>F A Food Products</b>	<b>Nishat Food and Chanachur Ind.</b>	<b>Bornali Bakery &amp; Confectionary</b>
Emergency exit door	Present	Absent	Absent
Properly stored unused equipments	Absent	Absent	Absent
Disposal system	Present but fair	Present but poor	Present but poor
Toxic substances properly stored	Absent	Absent	Absent
Doctors available	Absent	Absent	Absent

**Figure.1** Toilet facilities of both male and female workers



**Figure.2** Overall Housing structure of the industry



areas sometimes and packahing areas. Table 7 shows the conditions of the presence of safety measures and facilities in industries and showed although all the industries safety measures were poor or absent, FA Food products was comparatively better than other two industries.

The selected bakery industries present at Tangail Sadar areas are all the private factories and the areas is only few decimals. Housing infra-structure of the selected factories was not well enough but the F A Food Products surrounding wall

and floor is comparatively better than other two industries. Conditions of the machine room, packaging and sealing room and surroundings of selected factories also not good enough but F A Food Products is comparatively better than other two industries, the door, garbage system, approach road, ventilation and lighting arrangement is good category. Toilet facilities of both male and female workers were not highly satisfactory level. Practice of wearing aprons & caps by personnel of the considered industries shows only one industry abide by them but no workers have non-skid. Safety and well

maintained dangerous operations (boiler, steam pipes, compressors, rotary and cooking oven etc) in the factories and indicated that among them 66.7% of cases in rotary equipments and cooking oven were in good conditions.

## References

- Barendsz, A.W., 1998. Food safety and total quality management. *Food Control*. 9:163–170.
- Craun, G.F., 1986. *Waterborne Disease in the United States*. CRC Press, Inc. Boca Raton, FL.
- Damman, J., 1999. CBL-akkoord over BRC-standaard moet aantal audits reduceren. *Voedingsmid delen technologie*, 32: 15–17.
- DeMan., and John, M. 1999. *Principles of Food Chemistry*. Springer. ISBN 083421234X. <http://books.google.com/?id=kDYJ7a1HbD0C&pg=PA434>.
- Evans, J.R., and Lindsay, W.M. 1996. *The management and control of quality*. St. Paul: West publishing Company.
- Frost, R., 2008. "ISO 22000 is first in family of food safety management system standards". [http://www.iso.org/iso/iso-22000\\_food\\_safety.pdf](http://www.iso.org/iso/iso-22000_food_safety.pdf). Retrieved 28 February 2008.
- Hoogland, J.P., A. Jellema and Jongen, W.M.F. 1998. Quality assurance systems. In Jongen WMF and Meulenbergt MTG, (Eds.), *Innovation of food production systems: product quality and consumer acceptance*. Wageningen: Wageningen Pers.
- Leaper, S., 1997. HACCP: a practical guide. Technical manual/ CCFRA; no. 38. Chipping Campden: CCFRA.
- Surak., and John, G. 2008. "Comparison of ISO 9001 and ISO 22000". [http://foodsqm.files.wordpress.com/2007/11/comparison\\_of\\_iso\\_9001\\_and\\_iso\\_22000.pdf](http://foodsqm.files.wordpress.com/2007/11/comparison_of_iso_9001_and_iso_22000.pdf). Retrieved 28 February 2008.