

EFFECTIVENESS OF THE FOOD SAFETY ASPECTS IN SMALL MEDIUM ENTREPRENEUR'S BAKERY FOOD TECHNOLOGY OF DHAKA METROPOLITAN CITY

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Abstract: Bakery and confectionary products are dominated by small cottage industries in Bangladesh. The SMEs sub-sector plays an increasingly important role in the technology assimilation and dissemination in economic development of Bangladesh. Resources such as information, materials, technology, industry, and finance are too limited for Bangladeshi SMEs food sectors. 86% bakeries are small and 14% medium out of 50 selected samples at Dhaka Metropolitan city was investigated. Most of the entrepreneurs invested small amount of finance i.e., 1- 15 million taka. Large number of respondents i.e. 56% bakeries produced multi items such as biscuit, cake and bread were being of different qualities and only 10% produced single product. Production capacity of 84% industries were <500 Kg/day and 16% industries were >500-1000 Kg/day. Maximum industries have partial practice as per standard requirements of plant design, solid waste disposal and drainage facilities. 68% SME food industries used standard raw materials and remaining 32% had not. Only 4 to 4.5 % have good quality control and hygiene system, 74% poor sanitation & hygienic condition and 28% poor quality control; & 53.33% industries under regulatory license i.e,96% trade license, 54% BSTI license and 10% premises license and 46.67% have no regulatory license.

Keywords: SMEs, Bakery, GMP, GHP, Food Safety, BSTI

Introduction

The Small Medium Enterprises (SMEs) in Bangladesh is a sunrise sector that has gained prominence in recent years.. This sector serves as a vital link between the agriculture and SMEs bakery foods of the economy. Strengthening this link will be a great impotency to improve the value of agricultural products; ensure remunerative prices to the farmers, employs, entrepreneurs and also create a tremendous demand for Bangladeshi agricultural products in the world market. The SMEs sub-sector plays an increasingly dominating role in the technology assimilation and dissemination for economic development in Bangladesh. Bangladesh being one of the densely populated countries in the world with a lot of problems such as information, materials, technology, industry, and finance. As per the latest statistics¹ the total population of Bangladesh is near about 150 million. This huge population needs significant amount of food. Domestic production of food is insufficient to meet these huge requirements. Although Bangladesh is an agricultural country for a long time with food-deficit till before the year 1997. Since 1997, the country has produced sufficient quantity of food in addition to excess demand. The main food

processing industries in Bangladesh, especially in the rural-based food processing industries are rice husking mills, flour mills, mustard oil, dairy farms, poultry, bakery and confectionery, sweet, butter, cheese, iodized salt and handmade pickles, jam and jelly industry. On the other hand, the most export-oriented food processing industries are spices, crackers, cookies, bottled drinking water, and fruit juice. The agriculture sector is also the source of many of the small industrial sector's raw materials such as tea, wheat, jute and tobaccos accounts for 10% of Bangladesh's exports. Nearly 50 % of industrial sales from baked breads; 25% from rolls, buns, muffins, bagels and croissants; 10 % from soft cakes; and the rest from pies, pastries, donuts and a variety of sweet goods². Bakeries are not known for major occupational health risk yet precautions should be taken to protect workers and employees acquiring disease related to their work in bakery plant. Food manufacturing units should go for GMP, GHP, HACCP and ISO 22000:2005 for better hygiene and safe food production. "Adulteration" is a legal term meaning that a food product fails to meet the requirements for specifications of a particular standard. Adulteration usually refers to noncompliance with health or safety standards as determined in the United States by the Food and Drug Administration and the United States Department of Agriculture³. The Federal Food, Drug, and Cosmetic (FD&C) Act -1938 provides that food is "adulterated" if it meets any one of the following criteria such as it bears or contains any "poisonous or deleterious substance" which may render it injurious to health; and it bears or contains any *added* poisonous or *added* deleterious substance that is unsafe⁴. Bangladesh has achieved a significant progress in health & nutrition for the people. In spite of this progress, still the infant mortality rate is 51 per1000 and maternal mortality ratio is 3 per1000 live births. BSTI is the national standardization body in Bangladesh⁵ to implement the regulations. Science-based knowledge and technology may be involved but are not the main drivers of such innovations^{6,7}. Several research works have shown that barriers, such as a lack of trust in food safety and food quality requirements, an insufficient connection with enforcement officers, a deficient information system, may affect the process of adoption⁸.

The adoption of SMEs food sector activities are also part of a global social phenomenon, where competitive pressure, rivalry, mimetic behavior, opinion leadership have important effects. ZZ Abdirahman⁹ developed specific tools for strengthening of learning process between the SME and partners . Habibah Abdul Talib¹⁰ has concentrated the principle of quality assurance in food processing plant for Malaysian government in the production of quality food. India has around 60,000 bakeries and 20,000 traditional food units which have estimated market share about USD 373.4 million with 7.5% growth¹¹. In a study outcomes¹² of innovation include an enhancement of SMEs' reputation and image, an increase in operational efficiency and cost benefits, resulting in a better business financial performance, recruitment of a more skilled workforce, and greater in-house expertise leading to further innovation. Investigators¹³ assumed their result in contrast with the chemical industry, large food companies bear the highest costs, whereas the financial impact on small and medium-sized food companies remains limited. A group of researcher^{14,15} was conducted survey on considering the size of the enterprises managing EN ISO 14001, the micro enterprises represent only the 10%, the small enterprises represent 27% and the medium enterprises 33% of each category. In contrast, the 67% of the big enterprises already manage the standard which might suggest that EN ISO 14001 is still a need for the SMEs. Kazem¹⁶ reported

that the overall, exporting firms appeared to select more successful marketing and business strategies than nonexporters, and successful exporters were more entrepreneurial in Egypt. They also pointed the SMEs are important to the developing Egyptian economy, but the study of factors affecting their success or lack of success has implications for SMEs everywhere.

Materials and Methods

Methods of study were limited range of products and design relied on heuristics of exiting unit processes. Food safety and process hygiene were the main issues in food process design. The design aimed a single baking facility near the point of sale and production with different kind of bakery products, such as bread, biscuit, cake etc. The differences in size and final product attributes were reflected in different optimal handling and process conditions. During investigation of effectiveness for food safety and its technical aspects, the SMEs bakery food sector was selected at the area of Dhaka city Corporation, Bangladesh. In the study, relations among technology, quality and safety management and contextual factors were conducted from a generic and a specific point of view. A preset questionnaires were prepared for data collection from selected 12 metropolitan zones of Dhaka. Total number of sample was fifty and duration of study was 2009 to 2012. The primary data was collected on the specific level revealed that effective technological quality and food safety activities in the bakery sector such as technical management, feature of plant design, quality of raw materials & students system, control of quality, control of hygiene, control of contamination and information of adulterant. Secondary data was collected from different government and non government organizational publications. The collected data were compiled and analyzed scientifically as to get the outcome of the objectives using SPSS methods of analysis¹⁷.

Selection criteria of SME industries: Selection of SMEs bakery food sector was their structure of resources according to the declaration by SME foundation, Bangladesh¹⁸. Amongst the resources, space for small industry <2500 sft, investment of taka 0.05 to 15 million, and work force 50; & medium >2500-6500 sft, 15 to 200 million and 150 respectively.

Result

Results of the indicators for technological aspects are information on SME industries; facilities of plant design; quality & safety of raw materials; quality control & plant hygiene and regulatory requirements. Indicators of the bakery plant are presented as space, size, capital investment, manpower, product items, production volume and ownership.

Table 1: Size and space of SME selected bakery plant

Category of the Sample	Size/ space sq.ft/Investment(Tk)	Number of bakery	Percentage (%)
Small	<2500	43	86
	1-15 million	44	88
Medium	T>2500-6500	7	14
	<15 million	6	12

Table 1 shows that 86% bakery plant are small and 14% medium as per space & 88% are small and 12% are medium as per investment.

Table 2: Data on Small and Medium bakery plant in the context of manpower and invest

Invest money	Average manpower	No. of bakery industry	% of Bakery Industry
Small :<1-15 million	31	44	88%
Medium :>15-200 million	38	6	12%

Table 2 shows that 88% bakeries (small entrepreneurs) have 31 employees and 12% bakeries (medium entrepreneurs) have 34 employees.

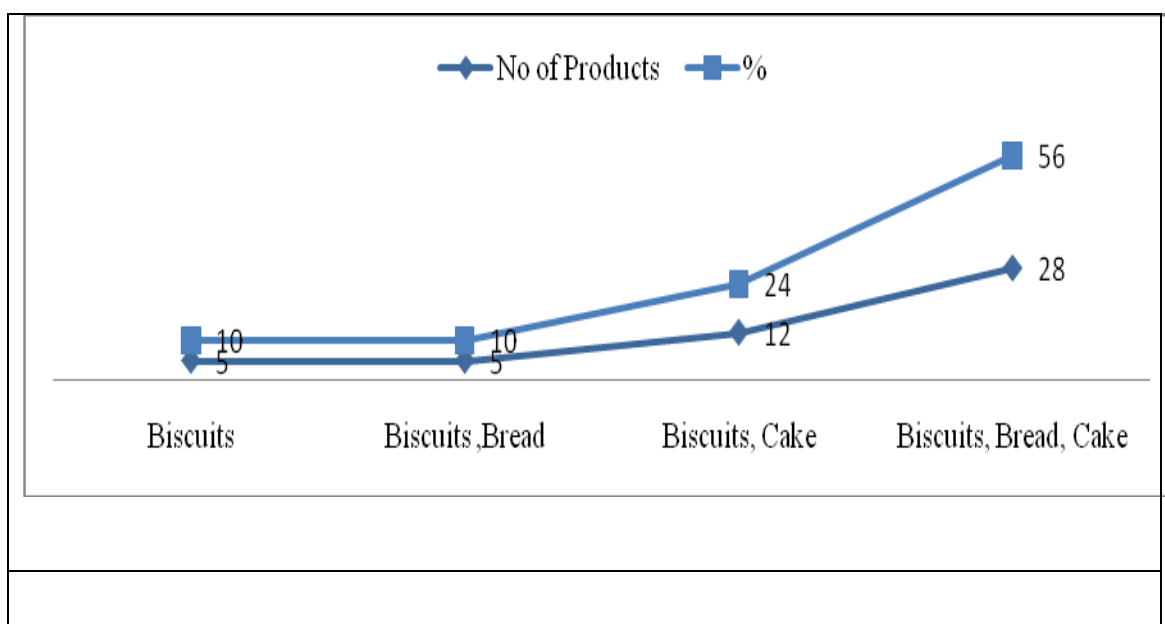
Figure 1: Data on SME bakery plant in the context of product variety

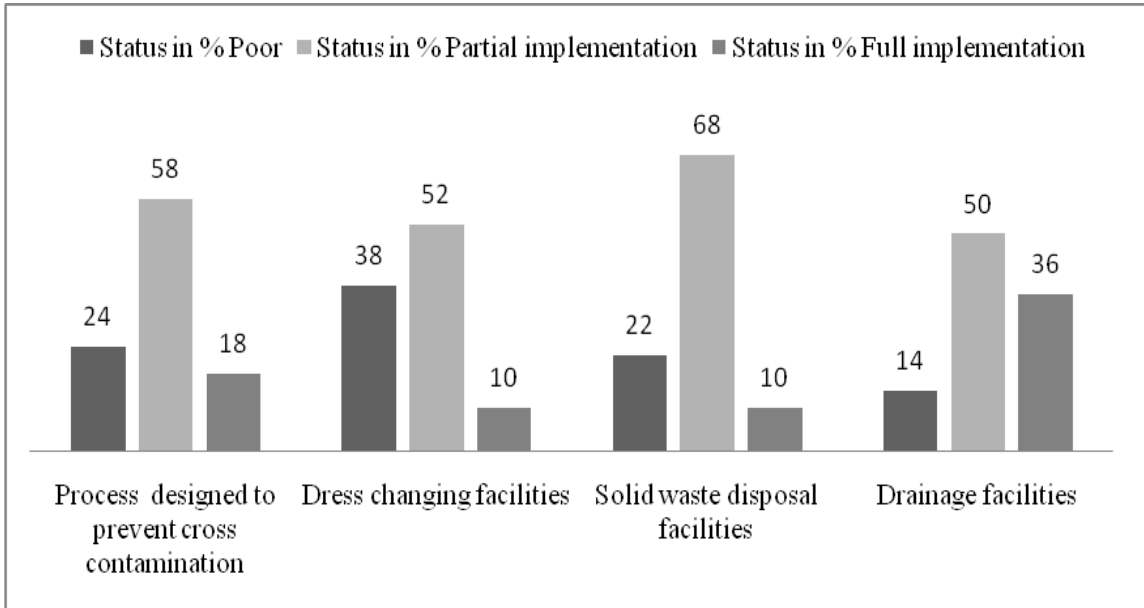
Figure 1 reveals that most of the bakery plant i.e., 56% produced 3 types of Biscuit, Cakes and Breads being of different qualities and only 10% bakeries produced single product.

Table 3: Data on SME bakery plant in the context of production capacity

Vol. of production(Kg/day)	Industrial status	
<500	42	84%
>500-1000	8	16%

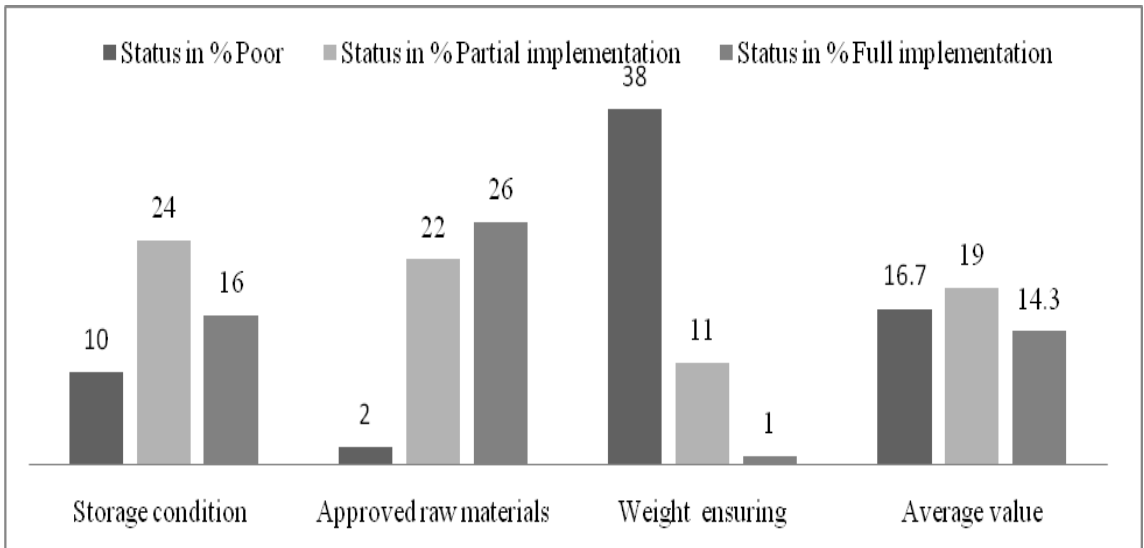
Table 3 reveals that most of the industries i.e. 84% produced <500 Kg/day and 16% produced >500-1000 Kg/day product.

Figure 2 : Data on individual parameter for facilities of plant design in bakery industry



(Score: 1-3 for the rating of poor; 4-6 for average; 7-9 for good)

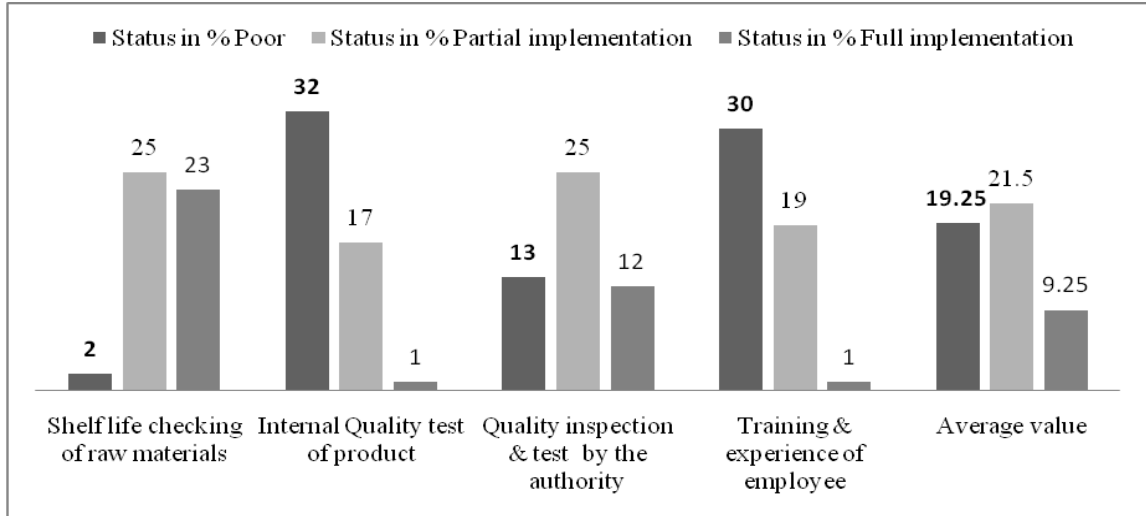
Figure 3: Data on individual parameter for storage condition and raw materials quality



(Score: 1-3 for the rating of poor; 4-6 for average; 7-9 for good)

Figure 3 shows the average values on different parameters for storage condition and raw materials quality i.e., 16.7% of poor; 19% of partial implementation and 14.3% of full implementation for good manufacturing practice.

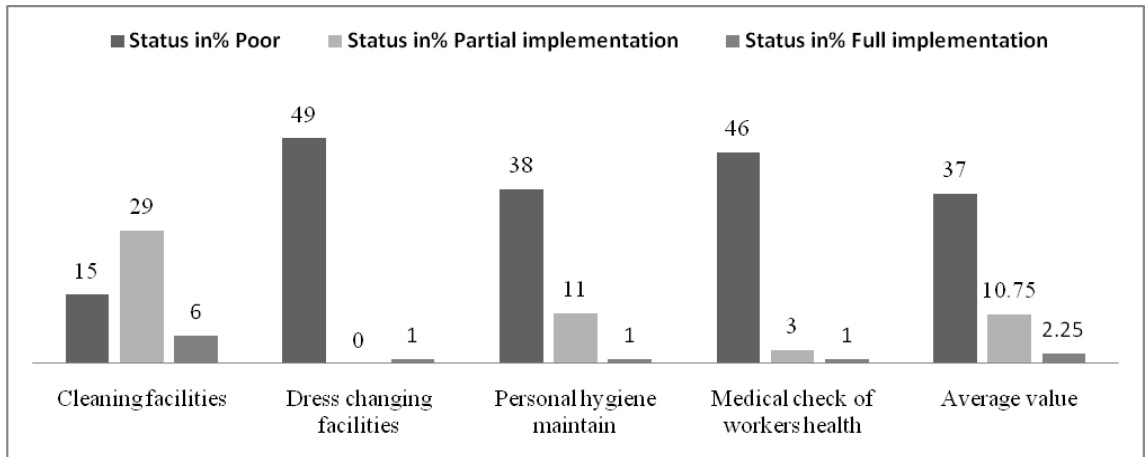
Figure 4: Average data on individual parameter for QC information of the SME bakery plant



(Score: 1-3 for the rating of poor; 4-6 for average; 7-9 for good)

Figure 4 reveals that the average values on different parameter for Quality control information of the SME bakery plant i.e. 19.25% of poor, 21.5% of partial implementation and 9.25% of full implementation for good manufacturing practice.

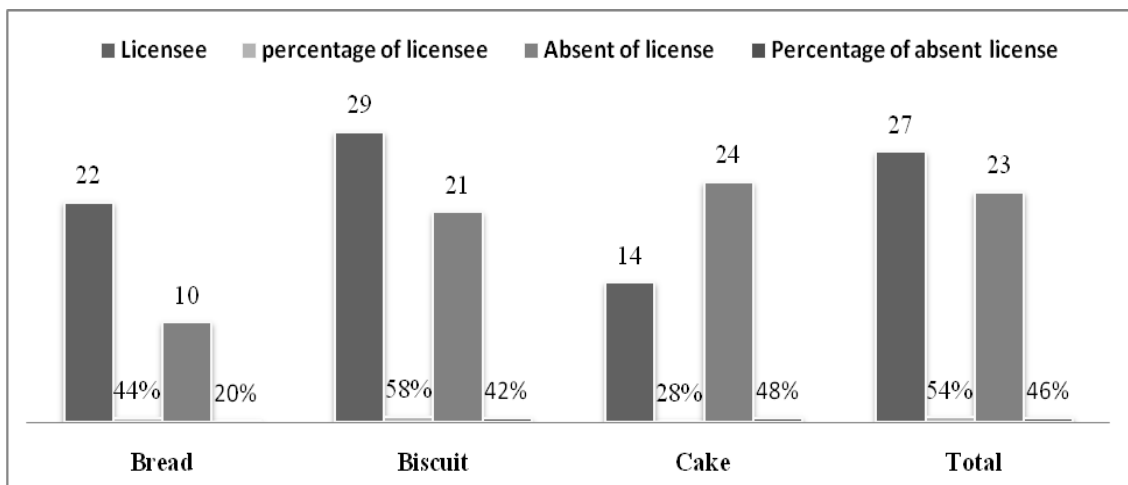
Figure 5: Average data on individual parameter of sanitation and hygiene status of selected SME bakery plant



(Score: 1-3 for the rating of poor; 4-6 for average; 7-9 for good)

Figure 5 reveals that the average values on sanitation and hygiene status of selected.

Figure 6: Data on government certification awarded of SME bakery plant



Result of government certification awards for SME bakery food industry i.e. 54% have license and 46% have not are shown in the figure 6 before marketing of finished products.

Discussion

Status of different parameters for standard plant design facilities in selected Bakery plants i.e., 24% for poor; 58% for partial and 18% for full implementation of process designed to prevent cross contamination; 38% for poor; 52% for partial and 10% for full implementation of dress changing facilities; 22% for poor; 68% for partial and 10% for full implementation of solid waste disposal facilities; & 14% for poor, 50% for partial and 36% for full implementation of drainage facilities respectively to maintain standard practice .

Conclusion

Food safety is an important public health issue in the under developing countries. Technologically small and medium enterprise i.e. SME food industries are facing a lot of problems such as lack of finance support, inadequate infrastructure and proper technology, low-level inputs, lake of knowledge relate to quality control, GMP, GHP, food safety and poor implementation of regulatory requirements. Effectiveness of the technological aspects of food safety in SME bakery industrial approaches and its measuring indicators were evaluated as a way of systematic guidelines for future.

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