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Food Safety Culture Paramount Than Traditional Food Safety System and Food Safety Culture in South African Food Industries

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***Abstract*—**The fact that traditional food safety system in the absence of food safety culture is inadequate has recently become a cause of concern for food safety professionals and other stakeholders. Focusing on implementation of traditional food safety system i.e HACCP prerequisite program and HACCP without the presence of food safety culture in the food industry has led to the processing, marketing and distribution of contaminated foods. The results of this are regular out breaks of food borne illnesses and recalls of foods from retail outlets with serious consequences to the consumers and manufacturers alike. This article will consider the importance of food safety culture, the cases of outbreaks and recalls that occurred when companies did not make food safety culture a priority. Most importantly, the food safety cultures of some food industries in South Africa were assessed from responses to questionnaires from food safety/food industry professionals in Durban South Africa. The article was concluded by recommending that both food industry employees and employers alike take food safety culture seriously.

***Keywords*—**Good Manufacturing Practices (GMPs), food borne illnesses, food safety culture, food safety system, HACCP.

I. Introduction

FOOD safety remains the bed rock of food production, processing, packaging and distribution of food. It deals with requirements that affect the characteristics that have the potential to be harmful to health or cause illness or injury to consumer [1]. Also according to [2], food safety focuses on the setting of standards regarding the safety of food, good manufacturing practices (GMPs) and quality control of agricultural products at all steps of the processing chain.

Food is regarded to be unsafe when it contains harmful substances i.e., hazards which can be biological, chemical or physical. However the type of hazards that easily cause food borne illnesses are biological hazards. FDA [3] recently reported on the sixteen organisms (hazards) that pose grave threats to all persons if they contaminate the food matrix. According to the report the organisms are; *Bacillus cereus, Campylobacter jejuni, Clostridium botulinum, Clostridium perfringens, Cryptosporidium, Cyclospora cayetanensis, E. coli* producing toxin, *E. coli O157: H7, Hepatitis A, Listeria monocytogenes, Noroviruses, Salmonella, Shigella, Staphylococcus aureus, Vibrio parahaemolyticus and Vibrio vulnificus.* Everyone therefore that comes in contact with food during its manufacture has a responsibility to ensure that the above biological hazards and other hazards do not contaminate the food processes.

The food industry uses different programs and systems to achieve safety and quality of food produced for consumption. The 5 categories of programs and systems that are employed in their operations have been reported by Alli [1]. The first group operates with the mandatory GMPs required by government regulations and food quality practices required by customers. The second group operates with HACCP systems required by government regulations or by customers and quality practices required by government or customers. The third operates with voluntary HACCP systems and quality practices required by government or customers. The fourth group operates with quality systems such as ISO 9001: 2000 or other non registered quality systems which address quality practices required by government and customers and the last group operates with quality systems and mandatory or voluntary HACCP systems. Food industries implementing HACCP are required to have HACCP prerequisite programs (i.e GMPs) in placed.

However food borne illnesses and recalls of food products continue to occur after food industries have manufactured food in the presence of food safety and quality programs and systems discussed above. This is as a result of companies not producing foods in an environment with food safety culture even though food safety system is said to be in placed. Food safety culture has now become paramount than food safety system because achieving food safety success in the global food system requires a holistic approach for prevention of risk.

According to Yiannas [4], food safety system i.e., traditional training, testing and inspectional approaches to managing is not sufficient to ensure food safety in today's changing environment. A better understanding of organizational culture and the human dimensions of food safety is paramount. Furthermore, for food safety performance of a retail establishment or a foodservice establishment to be improved, the behaviours and attitudes of both the employees and employer must change [4].

A good behaviour or attitude to food safety is the foundation of having food safety culture. According to Powell *et al.* [5], maintaining a food safety culture means that operators and staff know the risks associated with the products

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or meals they produce, know why managing the risks is important, and effectively manage those risks in a demonstrable way. This culture can best be created by application of best science with the best management or behavioural science. In addition communicating systems including compelling, rapid, relevant, reliable and repeated food safety messages using multimedia must be applied [4, 5, 6].

Furthermore, the importance of food safety culture cannot be overemphasized because measure such as food safety system alone is not sufficient to prevent incidents. According Aalberts [7], many national food safety control systems fail to provide an appropriate level of protection. The reason for this is not far fetched, many companies lack food safety culture. Some food companies cut corners while others focus on quantity or profit rather than focusing on quality. Covey [8], wrote about how some company leaders used low quality raw materials all in the name of cutting cost but in the long run the executives landed in jail and paid x 100 of the amount they thought they were saving.

Having considered the significance of food safety culture to making food safety system effective and realizing its objective, cases of food borne illnesses or contaminations that occurred in selected food industries that did not have food safety culture will be discussed.

II. Food Safety Incidents Occur in the Absence of Food Safety Culture

157 people most of them children became ill (however a five yr old Mason Jones died) after consuming cooked meats prepared by John Tudor & Son, a catering butcher business in 2005. The outbreak which occurred in South Wales was caused by *E. coli* O157: H7. A packaging machine used for both raw and cooked meats was identified as the possible source of contamination [5].

The outcome of the investigation of the causes of the outbreak showed that John Tudor & Son did not have a food safety culture though they claimed to have food safety system. Below are some of the results of the public enquiry [5].

- William Tudor (owner of the business) had a significant disrespect for food safety;
- Critical procedures, such as cleaning and separation of raw and cooked meats were not carried out effectively.
- Certain records that were an important part of food safety practice were falsified
- Environmental Health Officers (EHOs) were deceived on certain issues e.g use of packaging machine
- HACCP was poorly designed
- Little regard for food safety, making money a priority
- Poor maintenance & damaged construction disallowed proper cleaning.
- Staff were not properly trained and had poor hygiene habits
- Meats with off-odours were camouflaged with spices instead of removing them from the food chain.

Other food companies reported by Powell *et al.* (5) not to have food safety culture even though they had food safety system in placed were Mapel Leaf Foods, Canada and Peanut Corporation of America (PCA). While Mapel leaf foods's deli meats contaminated with *L. monocytogenes* in August 2008 caused 57 illnesses and 22 deaths, PCA products caused outbreak of *Salmonella* serotype Typhimurium in the US leading to the sickness of 691 people and death of 9 individuals in 46 U.S States and Canada.

The result of result of independent review of Leaf Foods, by Canadian government showed the company lacked food safety culture. Some of the findings according to [5] were;

- Focus on food safety was insufficient among senior management at both company and government organizations b4 & during the outbreak.
- No sufficient planning & preparation for a potential outbreak.
- No flow of communication between senior staff in quality control and CEO.
- No proper implementation of HACCP plan.
- *Listeria* spp was not top on the mind for staff at the plant.

FDA report about the cause Peanut Corporation of America outbreaks also showed that the company lacked food safety culture [5]. The findings also include;

- Plant was sometimes filthy with leaky roof. Windows were left open, allowing birds into the building.
- The company purchased low quality, inexpensive peanuts and paid food handlers minimum wage lawfully allowed
- Finished product that tested positive for Salmonella were retested until a negative result was achieved.
- PCA shipped product to customer despite the positive test or b4 test result was received
- There were inadequate controls to prevent contamination
- Insufficient cleaning and sanitation
- Facilities for hand washing were also used to clean utensils and mops leading to contamination of washed hands
- Equipment setting i.e., for temperature was not evaluated
- Raw and roasted peanuts were stored directly next to one another leading to potential contamination of roasted finished product
- Pests had open access to the plant.

Most food industries that profess to have food safety system in placed may in fact not be implementing it if they don't have food safety culture. Some of the companies use the principle when they are preparing for audit and it is business as usual after the audit. It is however unreasonable that food companies will not take food safety culture seriously when failure to do so affects them in a negative way.

The food industry loses in the long run when out breaks of food borne illnesses and recall take place. It was reported that tomato consumption dropped greatly leading to a loss of about $200 million after the nationwide outbreaks of *Salmonella* infection in 2008 in which tomatoes were suspected to be the causative agent [9]. According to Maki [9], more than 400 food products which include cookies, crackers, cereal candy,

ice cream and pet foods have been recalled in the U.S. The manufacturers of these products must have also lost millions of dollars.

Outbreaks of food borne illnesses as a result of consumption of foods or recalls of foods from the market place are however not frequently reported in South Africa and other developing countries. This does not mean that the food industry in these countries practice food safety culture. For example, from the independent survey by Christison *et al.* [10], of four branches of retail chain in Johannesburg, South Africa showed that some of the ready-to-eat foods and other processing utensils were contaminated with pathogenic bacteria such as *L. monocytogenes, Bacillus cereus* and *Salmonella* spp.

It has also been reported that more than 68 % of milk samples in India are not conforming to Food Safety Standards [11]. Reports of Chinese food industry also showed that 50 % of the companies fail food safety inspection [12]. Furthermore confirming the poor food safety of Chinese food companies, Astley [12], stated that "A major defect could be mould, strong odours showing spoiled food, any sort of living specimen, mud or dust traces, feathers in chicken meat, bones in a fish filet and other things that could turn the food production into a loss or put a consumer at risk".

In addition, according to Simpson [13], the Centre for Disease Control US has also recently warned that food-borne disease outbreaks caused by imported foods majorly spices and fish have been on the increase, signifying that many food processing premises in developing countries may not have food safety culture.

However the reason for the increased reporting of food-borne outbreaks in developed countries such as USA is mainly due to improved epidemiology surveillance which is lacking in Africa and other developing countries [14, 15].

III. Food Safety Culture in Selected South African Food Industries

The agro-processing sector in South Africa (SA) is very important in the sense that it contributes significantly to job creation, employment and foreign earnings. According to DTI [16], the sector (which includes food processing, beverages, aquaculture, horticulture & medicinal, aromatics and flavourants) contributed 2.7 % to manufacturing value-added in 2010 and it also employed 210,651 people (18 % of the total number of jobs in the manufacturing sector). The food processing sub sector employs about 178000 employees making it the largest manufacturing sector in terms of employment [16].

Apart from job creation, the sector is also important to the country because SA's produce and products are exported to EU and other countries. The country may in fact be among the top ten export producers in high value agricultural products [14, 17]. However, for the country to continue to repeat the benefits of the sector, every stakeholder cannot but make food safety the watch word. Nonchalant attitude to food safety may result in production, processing and distribution of contaminated food products to the local and international market with damning consequences. Food safety culture is therefore paramount because failure to do that may lead to loss of local and export market apart from products causing food borne illnesses and other public health risks.

To study the state of food safety culture of food processing industries in SA, fifty employees of leading food industries in Durban were asked to respond to 15 questions in terms of whether they strongly agree, agree, disagree and strongly disagree. The percentage of those that strongly agree and agree versus those that disagree and strongly disagree for each question was determined. The fifteen questions asked which had also been used by Seward *et al.* [6] are;

- New employees receive food safety training before they are allowed to work
- I appreciate when a co-worker points out to me if I am doing something that could affect food safety in a bad way
- I think my supervisor always puts food safety ahead of production
- I am comfortable stopping the line whenever I see something that might harm the quality and safety of the food we make
- I understand how food can get contaminated with bacteria or allergens that can make people sick
- Our decisions, actions, and behaviors do not change when we are audited or when senior leadership is in the building
- I understand how this plant measures food safety performance and how we are doing
- Food safety rules and procedures are reviewed with us regularly
- If I make suggestion that will improve food safety, I know it will be taken seriously
- Everyone on my shift always follows food safety rules and procedures
- When a food safety incident occurs, we aggressively address its root cause to make sure it doesn't happen again
- I think employee safety and food safety are very high priorities for leadership at this plant
- When I start a shift after the equipment and floors have gone through sanitation, they always look very clean
- Employees get recognized for their contribution to making sure that we produce safe food
- I am confident feeding myself or my family the products we make in this location

The analysis of the survey shows that 96 % of the food industry professionals in Durban South Africa agree and strongly agree with the first five attributes that shows whether a food company has food safety culture or not. About 86 % and 87 % of them agree and strongly agree with the attributes 6 – 10 and 11 – 15 respectively (Figs. 1-3). On the other hand, about 3.6 % of the professionals disagree and strongly disagree with attribute 1 -5, about 14 % and 13 % disagree

and strongly disagree with attribute 6 – 10 and 11 – 15 respectively.

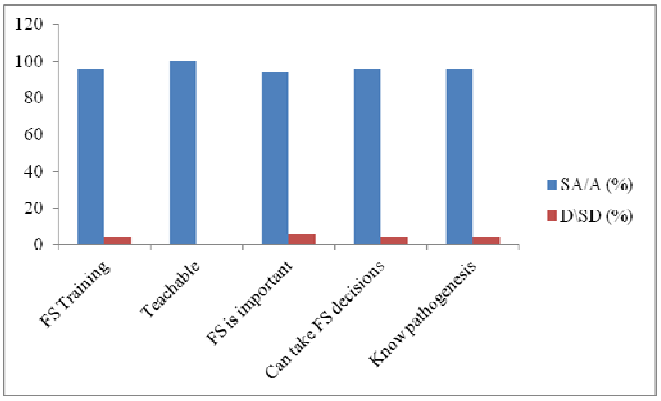

Fig. 1 Percentage of those that strongly agree & agree versus those who strongly disagree/disagree with attributes 1 -5

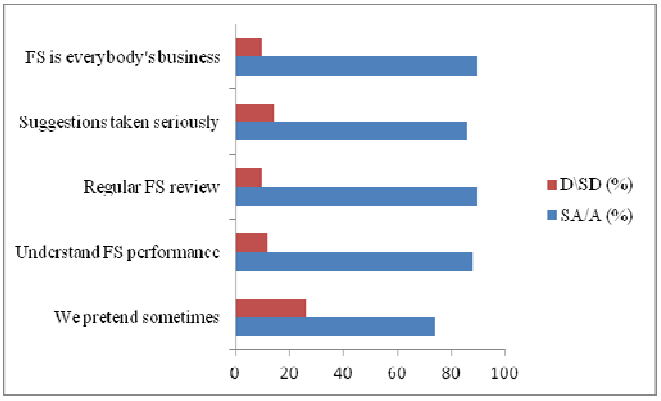

Fig. 2 Percentage of those that strongly agree & agree versus those who strongly disagree/disagree with attributes 6 – 10

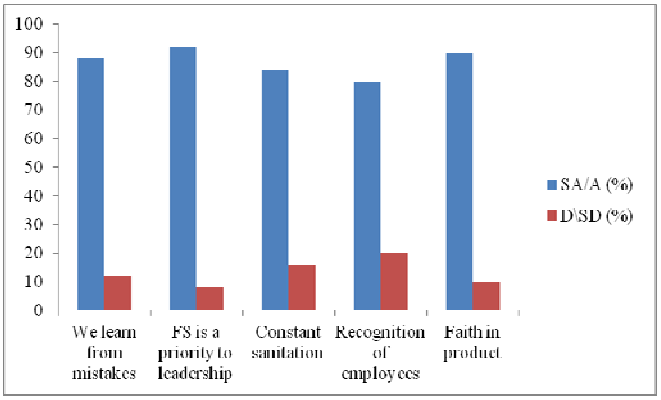

Fig. 3 Percentage of those that strongly agree & agree versus those who strongly disagree/disagree with attributes 11 – 15

About 26 % and 20 % of the food industry professionals disagree and strongly disagree with two of attributes. The first attribute is attribute 6 which is our decisions, actions, and behaviours do not change when we are audited or when senior leadership is in the building. The second attribute is attribute 14 i.e Employees get recognized for their contribution to making sure that we produce safe food. Attribute 6 shows that some of the food companies pretend when it comes to food safety signifying that they lack food safety culture. Attribute 14 also shows that the employees believe that the management does not really value food safety.

After considering the total 15 attributes, the survey finds 90 % of food safety professionals in Durban South Africa think their companies have food safety culture. It may therefore be reasonable from the above results to state that majority of the food companies in South Africa may have food safety culture. However we may not be able to totally rely on the response given by the professionals because some workers tend to overlook the shortcomings of their employers and cover their tracks when feeling in questionnaire so as to give the company a good image. In any case, the response of about 10 % of the food safety professionals showed that not all food companies have food safety culture.

The importance of food safety culture has also been become essential in South Africa because of the recent development regarding SA consumer increased preference for fast food or eating outside. According to the report, South Africa's appetite for fast food is growing rapidly. 25.3 million South Africans bought food from a fast-food outlet in a four-week period in 2011 [18]. Emphasis should be on food safety culture because food borne outbreak was reported to be significantly increased in the US when people began to eat outside [19, 20].

IV. Conclusion

This article amply demonstrated the importance of both food safety system and food safety culture however it has been emphasized in this medium that the latter is more paramount. Food industries in South Africa and in other places should therefore be more serious about food safety culture which demands a holistic approach. Motivation must be provided for continuous improvement. Food industry leaders or employers and employees at all levels of the organization must believe and show commitment to food safety.

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