

# **An evaluation of Food Safety and Quality Management Systems of the snack manufacturing industry in South Africa**

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## **Abstract**

Food snack organization in the Republic of South Africa is a basic aspect of the food conveyance framework, any place for food manufacturing and circulation inside the nation locale unit is profoundly influenced by snack food business activities. This investigation assesses the Food Security as well as Quality Control Systems of the food-making industry and tries to observe their issues in their usage. Reviews are controlled to general workers, bosses, and supervisors of 414 food-snack organizations in the two provinces of South African namely Gauteng and Mpumalanga. In preparation of this methodology, both primary and secondary data have been utilized. The Primary data were chiefly collected from a sample of workers from targeted companies and front-line executives through survey. Then Secondary data is then collected from entirely different sources such as company websites and publicised journals of the organizations and as well as from other relevant books. The main aim of this investigation is to examines the components of management operations within the snack industry and to single out challenges faced by snack food industries to follow correct Quality Control Systems.

## **Keywords**

Food Safety, Quality Management Systems, manufacturing industry, South Africa

## **1. Introduction**

The risk of foodborne diseases is continually developing with numerous upgrades in food production and utilization. Considering these progressions and difficulties, with an end goal to monitor customers, nations are getting stricter in their observation and guidelines. Pretty much every country around the globe, in extraordinary ways, many countries (governments) have spent significant time in food security (Duffey KJ, 2016). (Arnjadi, 2015)

In the Republic of South Africa, the benefit of overseeing food contamination flare-ups has been progressively monitored because of the developing number of snack food items consumed every day with the ever-growing of snack foods and pre-arranged snack foods. There has been an absence of public information on the seriousness of the issue, and no legitimate body and guidelines under which the overall population should reply/ report any cases or instances of food contamination. (Griffith, 2018)

Basically, these snack foods items are not really remembered on the shopping list of many people, yet they are regularly inside the stores, the drug store, and some other stores where people shop. (Khatri, 2017) (Pun, 2017)

In South Africa, the snack food industry is an important part of the food delivery system, where food production and distribution in the country are strongly encouraged by the company's operations. It is driven by women, who usually process food items on a small scale (Duffey 2016). The increasing spread of snack enterprise across the country has given rise to several products available on the market, even though most of them are unregistered and are not currently on the market. Although most of them are unregistered and are not currently licensed by regulatory companies consisting of the Food and Drugs Authority and the Standards Authority of South Africa. (Kujho, 2017).

Consumers are vulnerable to food-borne hazards that may additionally manifest themselves at any point in manufacturing processes, and thus a food safety and/or quality control system is the primary necessity for any food processing activity. (Kerr MA, 2020). Examples of such systems are the HACCP and ISO 22000 systems. There are

qualification systems that are intended to avoid hazards caused by physical, chemical, and microbiological hazards at any stage in food production and distribution. (Kleiner, 2016), (Cook, 2017).

Planning the board of activities in the snack foods industry today can be a troublesome procedure to meet ever changing demands of customers taste needs and wants.(Variety, 2017).

In South Africa, many snack manufacturing businesses are failing to meet expectations because of their absence of capacity to misuse effectiveness through the usage of value affirmation techniques to increase a favoured piece of the overall industry. (Martin, 2015).

This paper aims to evaluate the Food Safety and/or Quality Management Systems of the snack food manufacturing industry in Gauteng and Mpumalanga provinces of South Africa and sought to spot their challenges in its implementation. Growing competitiveness within the snack industry has created the need for successful management and stable innovation and productivity. This research will include progressive techniques based on the remodelling of snack manufacturing plants to include improvements in the snack food production safety and quality and effective quality management systems, the new technique would maximize resources and minimize overall hazardous from chemical and E. coli bacteria.

### **1.1. Problem statement**

One field specific to the food snack industry is the worry about food-borne illnesses and food-service operations, with serious crises typically far away from producers' minds. News outlets often announce accidents of this nature, contaminations of E coli bacteria, many of which have disastrous effects. In the summer of 2016, a small girl died of E. coli-related illness after eating a tainted meal in Gauteng (Wate 2018). Such tragedies are not rare in the food snack industry. According to the Centre for Disease Control and Prevention, an estimated 5,000 people die every year from gastrointestinal disorder in South Africa (Murakami, 2016). In the 1990s, about 16,000 children experienced food-borne illnesses from snack foods consumed in class lunch programs (Yannakoulia, 2017). Snack manufacturing companies should have an on-site crisis team that can play a part in the different forms of future emergencies that may arise. (Cook, 2017), (Mike Conor, 2017), (Kinderson, 2018). Many employees have put out to the industry executives that this may be caused by the company not following HACCP guidelines, Food Safety and/or Quality Management Systems in their company policies. (Cook, 2016).

### **1.2. Objectives**

- To examines the components of management operations within the snack industry.
- To examine the food Safety and quality management systems within the snack producing industries of South Africa.
- To understand how the snacks production processes are often incorporated with latest advanced technology while operating in accordance with both HACCP guidelines and company guidelines.

## **2. Literature Review**

### **A. FOOD SAFETY MANAGEMENT SYSTEMS**

The Food Safety Management System is utilized to improve the practices and frameworks utilized by the foods production enterprises characterized. Most of the food production organizations in South Africa did not have any sort of Food Safety Management System (FSMS) in situ. The rare sorts of people who had any sort of sanitation the executive's framework were either working under ISO 22000 guidelines or Good Manufacturing Practices. Only one organization rehearsed ISO 22000, and this organization was important for the organization only one organization rehearsed ISO 22000 and this organization was inside the dry-oil food snack industry. (Sikora, 2017).

Great Manufacturing Practices (GMPs) are applied in the activities by organizations working in the wet food snack industry and the dry non-oily food snack industry. The shortage of FSMS may prompt the low level of the business that has a working permit from FDA to South Africa for its production.(Van der Spiegel, 2016).

### **B. CHALLENGES IN IMPLEMENTING A FOOD SAFETY MANAGEMENT SYSTEM**

The essential for a review to get an FDA permit for a food production company is centred on brilliant assembling practises. A great part of the food business is tested to satisfy this necessity. While a portion of the food preparing enterprises had some sort of FSMS in situ, simply 75.0 per cent of them had an FDA working permit. (Holmback I, 2017)Accordingly, their FSMS does not meet the base models for GMPs. Range of issues faced by the food snack

business in the execution of their FSMS are staff preparing, item marking and documentation on cleaning, bug control, squander the executives and staple receipt convention, the most grounded challenge was the pre-use testing of bundling materials (97.0 per cent of the business) while the main concern was the raw material prerequisites (56.5 per cent of the business). (Figure 1). The Wet Food snack industry and thusly the Dry Oil Food snack industry have a high level of their organizations encountering challenges in actualizing any sort of FSMS. (Anon., 2015) (Figure 2)

This was additionally explored to decide the current technique utilized in the food snack industry (Anon., 2017). The three significant difficulties looked by the food handling industry in actualizing a sanitation the executives framework incorporate concerns identified with 'Direct test on pre-use bundling materials,' 'Wellbeing or Internal Control Points in your Processing Operations' and 'Recorded Standard Operating Procedure(s) for your Food Processing exercises.' These issues could be troublesome if there is an absence of information and preparing among staff or supervisors. 71 per cent of the food snack industry is not directing preparing for the labourers to encourage the work they are doing. This finding was a lot of like the attainability study completed on the Food Quality Management System among little and medium-sized ventures in Europe, which demonstrated that none of them had presented a genuine Food Safety Management System. The primary problem for actualizing the Food Safety Management System was the absence of information and readiness. (Efstratiadis, 2018).

### C. INTEGRATED APPROACHES FOR FOOD INDUSTRY

Agri-food production requires unique approaches to achieve the expected quality standard. It is necessary to understand the degree to which the structures contribute to the overall quality (Edelstein, 2016). The successful integration of the individual systems listed above would boost the efficiency of the organization. The HACCP is described as the policy of the highest quality method, not only manages to provide healthy food goods, but also guarantees a safe food supply a far better and simpler implementation of the whole quality system. (Norton, 2019) It is necessary to differentiate between the terms of assurance and management. The word assurance refers to the product itself and includes all safety assurance mechanisms (GMP, GHP and HACCP) and hence the Quality Assurance Control Points (QACP), the latter relating to quality assurance, not safety. Maintenance and/or incorporation of all the opposite quality characteristics of food (nutritional, sensory and convenience) in quality assurance systems is not requested by law, although desirable by customers (Buzalka, 2016).

On the other hand, the term management refers to the overall structure of the business in terms of product quality (including safety) and includes quality management systems-QMS (ISO-9000, ISO-14000, etc.) as well as TQM. The voluntary systems referred to as quality assurance and management systems include ISO 22000, ISO 9000, ISO14000 and/or ISO 18000. ISO 9001 can play a vital role within TQM by improving processes and procedures, but it is a small part of TQM operation. As a result, the efficiency of QMS will be dramatically improved by increasing the understanding of the relation between all standard and safety systems. (Houghton, 2018)

To enhance the efficiency of such systems, food manufacturers should combine or merge such systems to ensure that the food safety aspects and therefore the required quality attributes are protected by each. For example, the concepts of HACCP are often combined with ISO 9001 to resolve technical and management concerns related to food safety and quality. Thus, ISO 9001 is also useful for the HACCP appliance.

Most raw materials are made from natural ingredients; they are responsible for a high number of differences in taste for the comparable commodity of chips. The differentiation of the crop, the position of the entire crop, the weather and, finally, the storage conditions can influence the taste of the staple used, leading to variances of consumer satisfaction. When handling raw materials receivables within the snack industry, managers must note that the performance of the business is dependent on their efficiency. (Swatch, 2017)

The basic ingredients for the supply of chips are potatoes, oil, and flavourings. Purchasing and quality control must be very vigilant when choosing the product level. Potatoes must at the end of the day, processing requires up to 4 loads of potatoes to shape 1 ton of chips. Thus, every manufacturing facility must have a suitable storage area to ensure the correct conditions of the staple when it is required to have a very particular dry content and a selected amount of sugar to ensure a light-yellow colour.

### D. CHALLENGES TO COMPLIANCE

Individuals involved became the most demanding organizations in their attempt to incorporate comprehensive food safety management systems. This can be partly due to the low level of education and coaching of staff working in food safety management systems. This problem is rational, as most companies (73 per cent) have built and introduced

their food safety management systems in-house, making use of their own workers. Since generic knowledge and production skills are inadequate to develop and implement FSMS, a competency gap is created (Hess, 2015). This void, if ignored, would want to build a resilient culture; values could fall, and implementation could be sabotaged. This is being considered within the context of companies that have claimed that workers' resistance to change has become one of their top challenges. In addition to the regular rapid training courses on the growth of the know-how of food safety workers, additional know-how is required for experts who maintain and often improve the food microbiology and food safety framework chemistry (Bellisle, 2020).

However, it is not possible for small and medium-sized businesses to pay for the services of those specialists with the capacity to create, execute and sustain an integrated FSMS. The related financial difficulties emerged from the prices concerned while designing, imposing, and sustaining a food safety monitoring equipment. Some of these prices stand up from ordinary refresh training for all workers and sometimes advanced training for the standard of the workforce. Other prices increase from frequent audits at deliberate intervals, to determine whether a food safety scheme is compliant with deliberate plans and is carried out effectively and up to date on a regular basis. According to companies, the most pointless of such prices are those that come from clients who turn aside scheduled appointments, as companies must pay huge sums in line with every day of the visit.

However, given that compliance with the Food Security Regulation is increasingly mandatory in global value chains, and preserving food safety within the price chain depends on these small and medium-sized enterprises (who are the weakest links), It is very necessary that efforts are made to promote the enforcement of small and medium-sized enterprises with food safety regulations. The authorities are taking a cold step towards offering financial benefits to SMEs. (level, 2016).

### **3.Methods**

#### **A. DATA COLLECTION AND TOOLS FOR COLLECTION**

The study includes primary and secondary knowledge. Primary information is compiled by a sample of workers from targeted companies and all front-line executives. The questionnaire used is a preferential sample; the survey is confidential in a trial to validate the quality and validity of the responses. Secondary data is then collected from company websites and from entirely different sources wherever possible. A mixture of qualitative and quantitative data is collected for the purpose of presenting points of view and facts.

#### **B. RESEARCH DESIGN**

This study uses a mixed strategy approach that incorporates each quantitative and qualitative method. Qualitative information was obtained using open-ended questionnaires, and the claim is given within the results, And the study used these claims to include some of the means of the evidence and the explanations why much of the feedback was obtained. The open-ended questionnaires made it possible for the researcher to better understand the management of operations within a snack enterprise.

The convenient population is the fraction of the population to which study have fairly been admitted; it may also be a subset of the population that could be limited to the province, state, city, municipality, or company. The length of the pattern for each area is determined using the share distribution for the snack food industries. Provided by the Food and Drug Administration (FDA), a list of snack manufacturing industries and, as a result, the available contact addresses, snack industries were chosen from 2 provinces across Mpumalanga and Gauteng. 200 questionnaires were self-directed to the owners, managers and group supervisors of the food snack industries selected. The specificity of the questions has shifted to being given to the respondent via a face-to - face interview. The completed questionnaires have been confirmed to correct the errors and ensure the completeness of the questionnaire. Coding has been achieved to simplify the clean access of data using SPSS version 25.

### **4. Findings and interpretations**

A sum of 200 food-delivering snack firms, comprising of 144 (72 percent), 44 (22 per cent) and 12 (6 percent) wet snack foods, dry non-oil food and dry oil snack foods, taken an interest in the examination. A large portion of the snack food organizations (71.0 per cent) are arranged in private premises where private offices are shared. (Table1)

The regions of private premises that contention with assembling measures incorporate kitchens (12.0%), kitchens and lounges (3.0%), halls (36.5%) and family rooms (27.5%). A large portion of these offices (59.0 percent) does not have any difficulties/issues with their prompt environmental factors. Numerous with impediments to their surroundings were in waterlogged (12.0 per cent), dusty (37.5%), bother inclined (6.5%) and filthy (14.5%) climate.

Most organizations (84.0 per cent) do not have a Food Safety Management System (FSMS) set up. The not many that have such sanitation, the framework are either founded on ISO 22000 norms (0.5 per cent) or Good Manufacturing Practices (15.5 percent). Only one organization works ISO 22000, and this organization works in the dry-oil food house industry. Among the organizations in the wet snack food industry and the dry non-oil snack food industry, 10.4% and 36.4% separately apply Good Manufacturing Practices (GMPs) in their activities. The absence of FSMS is a factor prompting the low rate (12.0%) of the business that has an FDA-South Africa working permit for their production. Simply 6.3 percent, 16.7 percent and 29.3 percent of the Wet Snack Food organizations, Dry oily snack foods and dry non-oily snack food sources had an FDA-South Africa working permit for their production. The list of food snack enterprises, which incorporates both enrolled and unregistered organizations as of December 2019 (N=414).

Food items delivered by snack food production firms have been partitioned into three categories because of different production techniques. The sorts were as per the following: 'wet snack foods,' 'dry oily snacks foods' and 'dry non-oily snack foods.' 'Wet snack food sources' includes foods that have a serious extent of water and can require purification or the utilization of additives. Dry oil foods incorporate food sources that may have moderately low water movement, however the consistency of the food during capacity is undermined by the rancidity of its fats and oil content. 'Dry non-oily food' contains food that may have low water action after the handling. By and large, 72% of Snack food producers were in the 'wet food' class, trailed by the 'dry non-oil food' and the 'dry oily food' classification, with around 22% and 6% separately. The assessed all out-example size of 414 was resolved utilizing the Stat Cal populace overview in the Epi Info 7 software design program. For the assessment of the example size, an expected recurrence of 50% and a margin error of 5 percent were utilized. Corresponding weighting was utilized to compute the quantity of members for every one of the three classifications of snack food production ventures.

#### 4.1. Graphical Results

Table 1: Sorting of Snack food production company due to the type of food item produced and its approximate sample size.

Food category	Food items	Estimated Number	Sample size
Dry oily snack food	Pepper sauce, Soups, Snacks, Nuts	299	144
Wet snack food	Drinking water, fruit juices and beverages. Alcoholic beverages and yogurt drinks. Cereals, bakery products, powdered food, pastries.	24	12
Dry non-oily snack foods		91	44
Total		414	200

Table 2: Division of sample size across provinces and districts in the survey area

Site of firms	Sample size firms in various areas
<b>Gauteng Province:</b>	
East Rand (Ekurhuleni) district	38
West Rand district	32
Pretoria district	26
Johannesburg district	30
<b>Mpumalanga Province:</b>	
Emalahleni district	14
Nelspruit district	18
Nkangala district	6
Enhlanzeni district	8
Ermelo district	16
Barberton district	12
<b>TOTAL</b>	<b>200</b>

Table 3: Dispensary of the snack food manufacturing industry, based on the groups of snack food items produced, that comply to different questions on FSMS.

Question/Facilities with	Product category						Total (N = 200)	
	Wet Foods (N = 144)		Dry oily foods (N = 12)		Dry non-oily foods (N = 44)		n	%
	n	%	n	%	n	%		
Food Safety and/or Quality management system	15	10.4	1	8.3	16	36.4	32	16.0
FDA license for operational facility	9	6.3	2	16.7	13	29.5	24	12.0
Purposed built structure(s)	31	21.5	2	15.7	25	56.8	58	29.0
Specifications for raw materials	55	38.2	9	75.0	23	52.3	87	43.5
Documented inspection procedure for in-coming goods from supplier(s)	18	12.5	2	16.7	13	29.5	33	16.5
Documented procedures for Cleaning and Sanitation	21	14.6	3	25.0	14	31.8	38	19.0
Documented procedures for Pest and Waste Management	33	22.9	2	16.7	7	15.9	42	21.0
Equipment/Utensil Maintenance and Replacement Policy	22	15.3	1	8.3	14	31.8	37	18.5
Documented Standard Operation Procedure(s) for your Food Processing activities	11	7.6	2	16.7	13	29.5	26	13.0
Safety or Quality Control Points in your Processing Operations	1	0.7	2	16.7	8	18.2	11	5.5
Post-production assessment of finished products before release onto the market	50	34.7	5	41.7	22	50.0	77	38.5
Conduct test on packaging materials prior to use	0	0.0	1	8.3	5	11.4	6	3.0
Conduct training for your personnel to facilitate the work they do	35	24.3	1	8.3	21	47.7	57	28.5
Personnel/staff undergone the Food Handlers' Test to enable them process or manufacture food for sale	17	11.8	4	33.3	23	52.3	48	24.0
Products labelled to conform to regulatory requirements	26	18.1	2	16.7	20	45.5	48	24.0

Figure 1: Percentage of the snack food manufacturing firms with their numerous encounters in executing a Food Safety Management System.

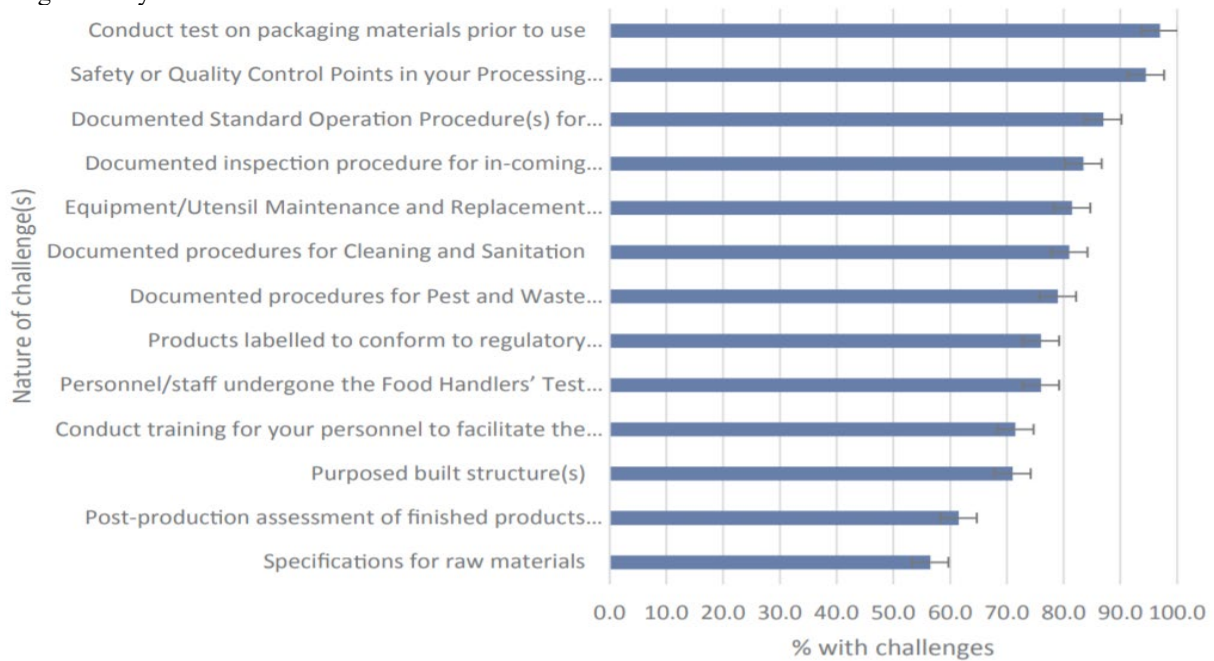
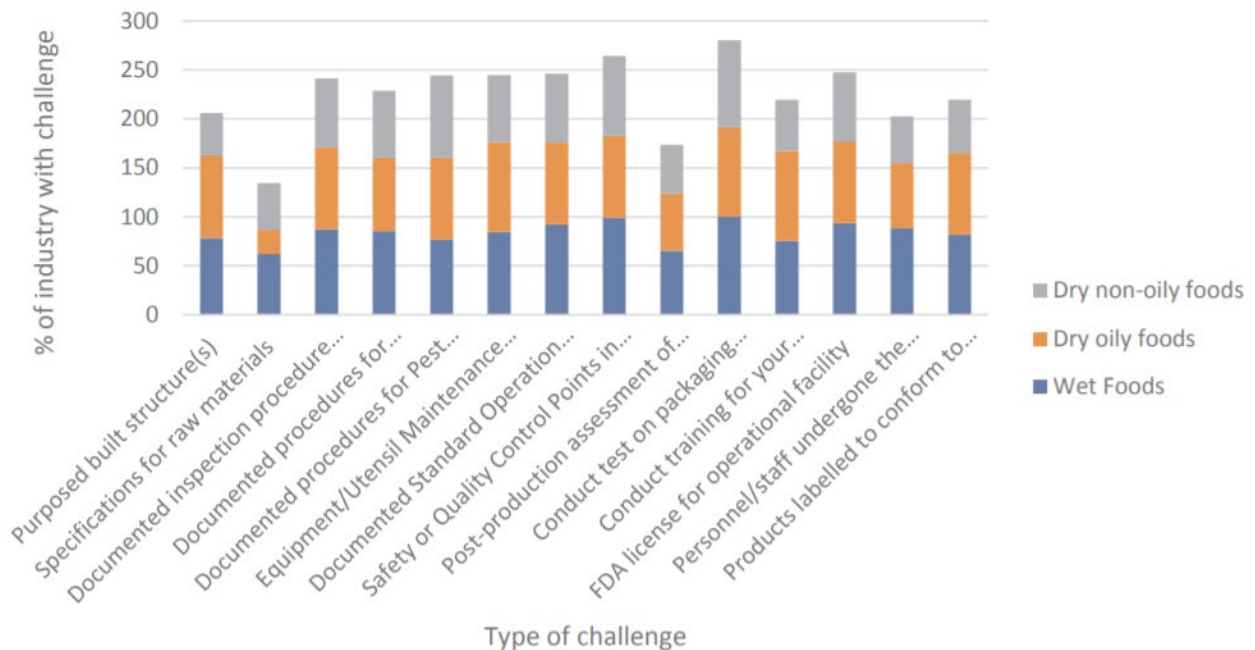


Figure 2: Percentage of the numerous categories of the snack food manufacturing firms and their encounters in executing a Food Safety Management System.



### 5. Recommendations

Based on the results of the report, the application of the Food Safety Management System is recommended. Given the obstacles to the implementation of HACCP and Food Safety Management system, authorities and snack foods industry/trade associations need to improve techniques to facilitate its implementation. When imposing HACCP

system in snack food industries, interest be paid to the strategies identified and tips developed through this Consultation.

It is encouraged that snack food industries in South Africa, such as in Gauteng and Mpumalanga, set up a central database of existing publications consisting of information on their scope, language and supposed use and make it accessible thru an internet site.

#### A. DISCUSSION

While food cleanliness has a wide scope of exercises among food and refreshment activities and is basically the obligation of the executives, the job that each specialist plays in the usage of the food cleanliness framework cannot be disregarded. Regarding the Hazard Analysis of the item, the CCPs were mutually recognized as the individual activities distinguished in the risk examination of the item. The size and danger evaluation of every primary region of the strategy has likewise been surveyed. These contribute legitimately to serious issues in plant resistance, staff, hardware or administrations breakdown and contamination and pervasion. The data shows a consistent reducing pattern for every client's grumbling and rebelliousness with the usage of the HACCP system.

### 6. Conclusion

Food Safety Management System is poorly practiced in snack foods production firms in South Africa. The processes of most of the snack food firms do not conform with necessities a Food Safety Management Systems, to assure the security of food, that will result in the conceding of market approval by the authority. That is, most workers of the snack food company do not get market approvals and product certification from governing agencies. The main challenges faced by the snack food industries in executing Food Safety Management System is because of insufficient information on procedures that has food safety implications as well as substructure and suitable processing equipment necessities. The Food Safety Management System utilized by the snack food producing industries in South Africa needs to be supported through capacity and infrastructural investment to guarantee safe food production.

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