Egypt. J. Chem. **Vol. 68**, No. 8. pp. 647- 655 (2025)

Egyptian Journal of Chemistry

http://ejchem.journals.ekb.eg/

Controlling Chemical, Physical, Biological Hazards and Allergens by Implementing a HACCP System in Noodles Technology

Abo-Elkair.A.S[1], M.F.Khallaf [2], Y.A.Abd-Eldaim[2], M.M.EL-Bayoumi[3]

[1]*Food Industry Tech. Dept., Fac. of Industry & Energy, 6 October Tech. Univ., Giza, Egypt.*

[2]*Food Science Dept., Fac.of Agric., Ain Shams Univ., Cairo, Egypt.*

[3]*Food Safety and Development Center, Qaha, Qalyubia, Egypt.*

Abstract

ISO 22000 food safety management system (FSMS) has used as a system for the production of noodles. Traceability system from receiving raw materials to the final product are also used. Food safety team was created. Noodle product was described and a flow diagram was constructed for noodles technology steps. The hazards were analyzed, the metals detection step was classified as a critical control point (CCP), while steps of the verify & draw sample for analysis, filtration oil, sieving of flour and filtration of alkaline solution have been determined as operational prerequisite programs (OPRPs). Hazard control plan, monitoring system, correction, corrective action, verification and documented information have been designed in this HACCP plan (food safety plan), until the production of a safe, packaged final product.

Key words: ISO 22000, HACCP, OPRPs, Food safety and Noodles technology.

1. Introduction

In the food safety world, there are many specifications and systems to represent (FSMS) like: BRC (British Retail Consortium), FSSC22000 (Food safety system certification 22000), ISO22000/2018. The common and international implemented standard overall worldwide are ISO22000/2018 which use the ISO roll PDCA (Plan- Do- Check- Act) cycle as a management tool for total quality management system [1,2] .

However; this tool specify in food industry to reduce the risk and produces safe products to enhance customer satisfactions. However HACCP as a control toll not sufficient to control overall manufacture process, so that; ISO22000/2018 as an integrated management system. (Managerial and technical implementation) is the optional system used since 2005 till now, as worldwide approved certificate in food manufacturing. Which include (GMP, GHP, PRP, OPRP and HACCP) [3-6]

Noodles are the common and commercial (as a ready to eat habits) food in many countries and also Egypt, Instant noodles, a globally popular convenience food, are favored for their delicious taste, ease of preparation, and convenience. Factors such as color, texture, cooking quality, and oil absorption significantly influence consumer acceptance [7].

Noodles are a staple food in many countries, including Egypt. Instant noodles have gained global popularity, with increasing consumption around the world. Their appeal lies in qualities such as taste, nutritional value, convenience, safety, extended shelf-life and affordability. Instant noodles are categorized based on the moisture removal method, either as instant dried or instant fried noodles. They come either flavored with seasonings or plain, often accompanied by a separate soup base sachet Typically, they are packaged in polyethylene bags, offering excellent storage properties.

Frying conditions of fried instant noodles are frying at 140-160 ºC for 60-120 sec made it contain approximately 20 % lipids and 8% moisture because it is dried and steamed. [8]

*Corresponding author e-mail: ahmedsobhy20244@gmail.com.; (Ahmed Sobhy Abo-Elkair).

Received Date: 11 December 2024, Revised Date: 28 December 2024, Accepted Date: 29 December 2024

DOI: 10.21608/EJCHEM.2024.343649.10964

The aim of the study is to implement (ISO22000, 2018) on the noodle technology for manufacturing safe and quality final product to achieve the consumer satisfactions and compliance with legislations. With the aim of identifying and analyzing the hazards and obtaining the highest levels of quality and food safety.

2. Material and Methods

Studying site:

The study was completed during 2023:2024 at one of companies for noodle industry, which is classified as large capacity plant (production for 22 ton per day), located in one of the industrial area in Egypt.

2.1 Instant noodles processing

The major ingredients for instant noodles are wheat flour, salt (alkaline salt solution of potassium carbonate (E452) & sodium carbonate (E500) as antioxidants, as well as sodium phosphate as preservative agent (food grade)) and water. minor ingredients like corn starch, Thickness agent (guar gum), stabilizers, emulsifiers, coloring and flavoring agents are also used to improve the texture, nutritional qualities and shelf life of the product [7].

2.2 Food safety system program

The study indicates to HACCP protocol according to the Codex Alimentarius and guidelines for its implementation, [9,10] and application of food safety management system (FSMS) accordance requirements of the International Standard (ISO22000:2018) to potential food hazards whether physical, chemical and biological, were identified, according to [11].

2.3 Food safety protocol and its principles:

The study of food safety system identification in the noodles technology was includes:

Step 1: Formation of the food safety team.

Step 2: Characteristics of the ingredients (raw materials), Packaging materials and the final products.

Step 3: Determine the product intended use of noodle.

Steps 4&5: Design a flow diagram with describes the operations.

Step 6: Hazard analysis validation and combination of the control measures.

Steps 7&8: Hazard control system.

Step 9: Monitoring the OPRPs and CCPs.

Step10: Correction & corrective actions

Step11: monitor controlling and measuring verification.

Step12: Establish documented information. [11-13]

2.4 Risk assessment parameters:

Risk assessment was conducted risk management and communication. Decision tree was applied to each step in the technological process in respect of an identified hazard to identify CCPs or OPRPs, [14-16].

3. Results And Discussion

3.1 Formation of Food Safety Team

The team of food safety group consisting of seven members was constituted, with head of quality appointing as a food safety team leader. The rest of the team consists of the production manager as a deputy leader, and the team members are maintenance manager, senior lab analyst, stores supervisor, document controller and marketing manager. According to ISO 22000, 2018. The food safety team can be seen in **Table (1),** [13,17,18].

3.2 Row materials Characteristics, ingredients, packaging materials and the final products as well as its intended use

Fried instant noodles usually cooked in boiling oil for the common people, but it should be avoided by people with gluten allergen. [19] Packaging was in polypropylene or polyethylene film, the time of shelf-life is 9 months from the date of production. Moisture: less than 10%, total fat with in: 15-20 %, peroxide value: less than 10 meq O_2/kg, acid value: less than 2 mg KoH/g , *Salmonella spp.* ND/25g, *E.coli* and *Staphylococci* less than10 cfu/g as seen in **Table2,** [20-24]

Table (1): Formation of food safety team for noodles factory

No.	Position	Authorities
1	Head of quality	Food safety team leader
2	Production manager	Deputy leader
3	Maintenance manager	Team member
4	Senior lab analyst	Team member
5	Stores supervisor	Team member
6	Document controller	Team member
7	Marketing manager	Team member

3.3 Design a flow diagram with describes the operation steps:

A specialized flow diagram has been created for the noodles production. The content of the flow diagram are seen in **Figure (1)**. It was verified to establish the flow diagram accurately represents operations used in the manufacture of the noodle. This was formed by observing each process of manufacturing. The description of the characteristics of noodle **(Table 2),** was used to warning the consumer of possibility hazards in the end products. [8,11,17]**.**

3.4 Hazard analysis validation of control measures and combinations of control measure

Firstly, the evaluation was carried out upon receiving raw materials through a visual inspection, then analysis in laboratories to define if there were food safety, fraud as well as defense hazards, or receipt with a certificate of analysis (COA), Storing raw materials and following good storage practices (GSP), with the store supervisor following the first-in first-out (FIFO)system in distribution the raw materials, the hazard analysis was performed the receiving of primary materials stage and for all processing stages of noodles shown in **Table (3).**

3.5 Hazard control plan

As a result of the work sheet (**Table 3),** the food safety team identified only one step of the process that be CCP, this is metal detecting. And Created the control measure for it as follows: periodic calibration once or twice every hour with calibration cards**,** while the verify & draw sample for analysis is classified as a OPRP1, the oil filtration stage is categorized as a OPRP2, the sieving of flour stage is classified as a OPRP3, the filtration of alkaline solution is categorized as a OPRP4 and frying is categorized as a OPRP5. The critical limits must be setup to gage that the agreeable level identified for each hazard at each CCP is not overrun. During CCP identification, determine critical limits should be commensurable where it could be reasonably demonstrated that the threshold level has not been overrun and recorded all of their points [25-27]

3.6 Established of monitoring systems, corrections, corrective actions, verification procedure and documented information

The food safety plan should monitoring technique for CCPs to be under the control, verification, validation and review of determined food safety plan, were established during the investigation of noodles plan. The verification procedures were established to check, and recorded all of that in Record Keeping and documented information shown all in **Table (4).** [21]

Table (2): Noodles description and determine the product intended use

Description	Information
Product name	Fried instant noodles.
Content / ingredients	**The main ingredients:** Wheat flour, water and salt (alkaline salt solution of potassium carbonate, sodium carbonate as well as sodium phosphate (food grade)). **Other ingredients:** Corn starch, Thickness agent (guar gum), emulsifier (lecithin), coloring and flavoring agents (seasoning & chili) and palm oil for frying.
Important characteristics of the end product	Usually cooked in boiling oil (at 140:160 ºC for 60:120 Sec). Moisture: less than 10 %. Total fat: 15-20 %. Peroxide value: less than 10 meqo$_2$/kg. Acid value: less than 2 mg KOH/g. *Salmonella spp*: ND/25g. *E.coli*, Staphylococci: less than 10 cfu/g. According to **ES. 4767 (2005) and NFSA, (2021a), [20,22].**
Target consumer & intended use	Fast food eaten alone or with some other foods, for the common people, it should be avoided by people with gluten allergen.
Total weight of the final product	70 gm.
Packaging	The packaging material that used for the product are polypropylene film for noodles (17cm ×12cm ×1.2cm).
Labeling instructions	Setting instructions are required ‹*e.g.* net weight‹ type of additions, if any; trade mark.
Shelf-life	9 months from production date at store conditions (25ºC and 60% humidity).
Place of solding	Supermarkets.
Storaging & Handling	Free of the physical damages, temperature extremes and overrun humidity, stored at room temperature (25ºC) and low humidity (60%).

ND= Not detected, **cfu/g**= colony forming unit/ gram.

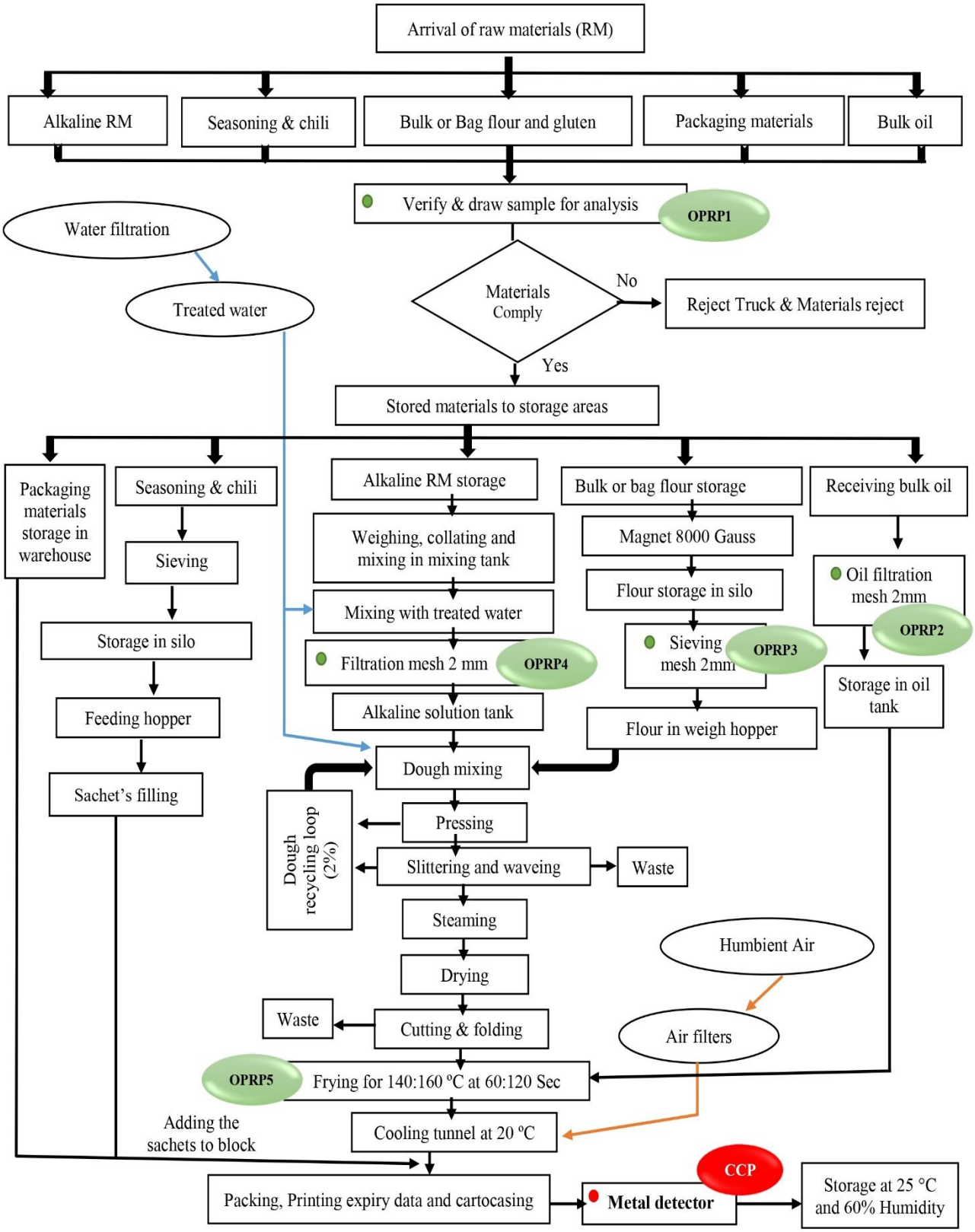
Arrival of raw materials (RM)
Alkaline RM
Seasoning & chili
Bulk or Bag flour and gluten
Packaging materials
Bulk oil
Verify & draw sample for analysis
OPRP1
Water filtration
Treated water
Materials Comply
No
Reject Truck & Materials reject
Yes
Stored materials to storage areas
Packaging materials storage in warehouse
Seasoning & chili
Sieving
Storage in silo
Feeding hopper
Sachet's filling
Alkaline RM storage
Weighing, collating and mixing in mixing tank
Mixing with treated water
Filtration mesh 2 mm
OPRP4
Alkaline solution tank
Bulk or bag flour storage
Magnet 8000 Gauss
Flour storage in silo
Sieving mesh 2mm
OPRP3
Flour in weigh hopper
Receiving bulk oil
Oil filtration mesh 2mm
OPRP2
Storage in oil tank
Dough mixing
Dough recycling loop (2%)
Pressing
Slittering and waveing
Waste
Steaming
Drying
Humbient Air
Air filters
Waste
Cutting & folding
OPRP5
Frying for 140:160 ºC at 60:120 Sec
Cooling tunnel at 20 ºC
Adding the sachets to block
Packing, Printing expiry data and cartocasing
CCP
Metal detector
Storage at 25 °C and 60% Humidity

Table (3): Noodles hazard analysis and critical control points .

Processing Step	Hazard type	Hazard description	Risk assessment			Control measure	Decision tree				Decision CCP / OPRP
			S	O	S × O		Q1	Q2	Q3	Q4	
Reciving of Raw materials (Verify & draw sample for analysis)	P	Presence of impurities and foreign matter	2	4	8	Visual inspection	Y	N	Y	N	OPRP 1
	C	Aflatoxin,heavy metals,pestiside residues, food additives and preservation	2	3	6	Lab tests and certificate of analysis (COA)	Y	N	Y	N	
	B	Insects, microorganisms (*Staphylococcus aureus , salmonella , Escherichia coli*)	4	4	16	Lab inspection, lab tests, pest control protocol. Keep containers closed and secured in proper place. Compliance with good hygiene practices (GHPs) practices. Keep facilities, equipment and utensils for the process properly sanitized. Perform {first-in-first-out} (FIFO) for the stock rotation.	Y	N	Y	N	
	A	Gluten allergy (not used)	-	-	-	-	-	-	-	-	
Oil filtration	P	Presence of Impurities, foreign matters	2	4	8	Visual inspection	Y	N	Y	N	OPRP 2
	C	Remains of cleaning and disinfecting materials, rancidity of oil	1	2	4	Training workers on the correct cleaning method for the production line (CIP and COP), doing peroxide value test	Y	N	N	-	-
	B	Not hazard	-	-	-	-	-	-	-	-	-
Sieving of flour	P	Impurities and foreign matters	3	3	9	Visual inspection , Periodic inspection of sieve slices daily and weekly	Y	N	Y	N	OPRP 3
	C	Not hazard	-	-	-	-	-	-	-	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Filtration of alkaline solution	P	Presence of Impurities, foreign matters (container bag, sacks, workers hair)	2	4	8	Visual inspection , training of (GHPs) as well as the good manufacturing practices (GMPs)	Y	N	Y	N	OPRP 4
	C	Remains of cleaning and disinfecting materials	1	2	2	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Dough mixing	P	Presence of Impurities, foreign matter (container bag, sacks, workers hair)	2	2	4	Use a closed mixing system , Compliance with (GMPs)	Y	N	N	-	-
	C	Variation of additives (inappropriate weight), Remains of cleaning and disinfecting materials	2	2	4	Reviewing the record of added materials and verification of balances , Training workers on the correct cleaning method for production line(CIP and COP), Toxicity test for detergent residues	Y	N	N	-	-
	B & A	Wrong behaviour from food handler	-	-	-	-	-	-	-	-	-
Pressing	P	Not hazard	-	-	-	-	-	-	-	-	-
	C	Remains of cleaning and disinfecting materials	1	2	4	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Slittering & Waveing	P	Metal residue from machine	1	2	2	Periodic maintenance of machines	Y	N	N	-	-
	C	Remains of cleaning and disinfecting materials	1	2	4	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not usually	-	-	-	-	-	-	-	-	-

(Continued)

Processing Step	Hazard type	Hazard description	Risk assessment			Control measure	Decision tree				Decision CCP / OPRP
			S	O	S × O		Q1	Q2	Q3	Q4	
Steaming	P	Not hazard	-	-	-	Following the water source filter	-	-	-	-	-
	C	water hardness	2	2	4	Periodic analysis of the water source for hardness visual inspection for steaming nozzles	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Drying	P	Not hazard	-	-	-	-	-	-	-	-	-
	C	Remains of cleaning and disinfecting materials	1	2	4	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Cutting& Folding	P	Not hazard	-	-	-	-	-	-	-	-	-
	C	Remains of cleaning and disinfecting materials	1	2	4	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Frying	P	Foreign matter	1	2	2	Follow up the cleanliness of frying oil	Y	N	N	-	
	C	Oxidation of oil ,Heavy metal contamination	5	4	20	Draw sample for analysis and following the oil change process (daily free radical and peroxide value tests)	Y	N	N	-	OPRP 5
	B & A	Not hazard	-	-	-	-	-	-	-	-	
Cooling	P	Dust from the air source	1	2	2	Follow up the air filtration system	Y	N	N	-	-
	C	Remains of cleaning and disinfecting materials	1	2	2	Training workers on the correct cleaning method for the production line (CIP and COP)	Y	N	N	-	-
	B & A	Not hazard	-	-	-	-	-	-	-	-	-
Packing	P	Metals detection	5	5	25	Metals detection (Periodic calibration twice an hour with calibration cards)	Y	Y	-	-	CCP
	C	Migration , rancidity , toxicity …etc.	2	3	6	Doing migration tests periodically for packaging materials. Analysis for comply with national regulation including chemical and biological tests (full scope)	Y	N	N	-	-
	B	Pathogen growth (Staph , Salmonella , *E. coli*)	3	4	12	Following the sterilization system in the filling machine	Y	N	N	-	-

Q1= Can precursor programs like GHPs control the substantial danger to an acceptable degree at this stage? , **Q2**= Is there a specific control measure in place at this stage for the identified significant hazard? **Q3**= Will the detected major hazard be prevented, eliminated, or reduced to an acceptable level by a future step? , **Q4**= Is the identified substantial hazard particularly prevented, eliminated, or reduced to an acceptable level by this step? , **P**= Physical hazard, **C**= Chemical hazard , **B**= Biological hazard, **A**= Allergens, **S**= Severity, **O**= Occurrence, **Y**= Yes , **N**= No .

[Risk assessment marix evaluation by scale (1-4 low risk & 5-10 medium risk & 12-25 high risk)].

Table (4): Critical limits, monitoring, correction, corrective action, preventive action, verification and records of CCPs.

No.	Item		Description
1	**CCP**		Metals detector
2	**Hazard**		Metals shred, parts of machine and metal pieces
3	**C.L**		SS (1.7 mm), Fe (1.2 mm) and Non Fe (1.2 mm)
4	**Monitoring**	**What**	Metals detector
		How	In accordance with device manufacturer guide lines
		when	Every two hour or at the start, hourly, at beginning of each product, after breakdowns
		Who	Packing supervisor and quality control in charge
5	**Correction**		If any of the test pieces is not detected and not rejected, inform the quality assurance manager and maintenance manager immediately. Below mentioned actions shall be taken: 1. Fix the problem of metal detector 2. The product produced after the last check shall be kept on hold. 3. The held product shall be reprocessed again by passing through the metal detector again. 4. All rejected product shall be disposed off. 5. The product already dispatched shall be recalled and recall procedure shall be followed.
6	**Corrective Action**		1-Quality team leader withdrawal the product in accordance with manufacturing guide lines. 2-Quality team leader shall call his team to verify the CAR, corrective action should be taken. 3-Quality team leader shall raise CAR, if required. 4-After raising CAR, the corrective and preventive action procedure shall be followed.
7	**Verification**	**What**	Metal delectability of the machine
		How	1- First put 1.2 mm FE test standard at the front side of the product and observe the test piece and the product is rejected. 2- Put 1.2 mm FE test standard at the middle of the product and observe the test piece and the product is rejected. 3- Put 1.5mm FE test standard at the backside of the product and observe the test piece and the product is rejected. 4- Then repeat the same procedure with 1.2 mm NFE and 1.7 mm SS.
		when	Once / 2 hour
		Who	QC person
8	**Records**		1- Metal detection monitoring record 2- Corrective action report 3- Maintenance record

SS = Stainless steel **Fe** = Ferrous, **Non Fe** = Non Ferrous, **CL** = Critical limit, **QC** = Quality control, **CAR** = Corrective Action Report.

4. CONCLUSION

The implementation of food safety management system (using (FSMS)) according to the International Standard ISO22000:2018 in noodles processing industry from farm to fork was done in several stages, HACCP system is developed step-by-step based on 12 step in this model, the risk assessment of physical, biological, chemical and allergen hazards were created. Metal detecting stage was determined as a CCP in the production line. The critical limit, monitoring procedure, correction, corrective action, verification procedure and documentation system were created in the noodles factory, while the verify & draw sample for analysis was classified as OPRP1, oil filtration stage was categorized as a OPRP2, sieving of flour stage classified as OPRP3, filtration of alkaline solution was categorized as a OPRP4 and frying was categorized as a OPRP5 were both located monitoring systems necessary to control them. As a conclusion the applying of FSMS (ISO 22000/2018) was a complying system to monitoring and control off all risk and hazards to produce safe product and recommend need more research to enhance the process control in this industry.

5. REFERENCES

1. **Alexsandra, A.B.; Nayara, M.D.; Otávio, A.M and Fernanda, R.(2019).** The hazard analysis system and critical control points as a quality tool in brazilian food industry. Revista Brasileira de Higiene e Sanidade Animal., (v.13, n.2) p. 179 – 190.
2. **Antoaneta, S.; Velichka, M.; Daniel, S.; and Damyan, K. (2022).** Food Safety Management System (FSMS) Model with Application of the PDCA Cycle and Risk Assessment as Requirements of the ISO 22000:2018 Standard, Standards 2022, 2, 329–351.
3. **International Standards Organization, ISO (2009).** ISO/TS 22002- Part 1. Prerequisite prograaes on food safety - Food manufacturing.
4. **Abdel Moneim, E.S.; Heba, M.S. and Zakaria, A.S.(2013).**The design of hazard analysis critical control point (HACCP) plan for biscuit plant .Food and Public Health, 3 (5): 240-246.
5. **Sara, M.; Carol, W. (2013).** HACCP A Practical Approach Book, Foreword by William H. Sperber. (ed), Springer, .276p, United Kingdom , USA.
6. **NFSA, National Food Safety Authority. (2021b).** Check List for Factories, Terms and coditions ISO22002, 2009.
7. **Neelam, G.; Vandana, D. and Khatkar, B. S. (2014).** Instant noodles: prossing, quality, and nutrition aspects. Food Science and Nutrition, 37 (41): 1-44.
8. **Ioannis, S. A. and Athina, T. (2007).** A Comprehensive review of the implementation of hazard analysis critical control point (HACCP) to the production of flour and flour-based products. Food Science and Nutrition, 45 (5): 363-370.
9. **E.S, Egyptian Standard Specifications, 3778 (2005)** for Hazard Ananlysis Critical Control Point System and Guide lines for its Application .
10. **Codex Alimentarius Committee. CAC CODEX STAN 80:2023.** (Food and Agriculture Organization of the United code of practice on food allergen management for food business operators. (CXC 80-2023).
11. **International Standards Organization, ISO 22000 (2018).**Food safety management systems - Requirements for any organization in the food chain.
12. **Suvasish, D.S.; Shahariea, K.J.; Rashida, P.; Ashrafuzzaman, Z.; Dipak, K.P.and Toufiq, E . (2019).** Development of a HACCP-based approach to control risk factors associated with biscuit manufacturing plant, Bangladesh. Nutrition & Food Science, https://doi.org/10.1108/NFS-03-2019-0074.
13. **Diki, N.S.; Wisnu,C.; Maisa, H.N.; Christina, L.H.;**
Hendarwin M. Astro1 and Taufik, R. (2024). Study of HACCP (Hazard Analysis And Critical Control Point) identification in anchovy sago noodles processing. EDP Sciences., BIO Web of Conferences 99, 02014.
14. **Marcia,N.B. and Nagamuttu S. A. (2005).** Implementing Hazard Analysis Critical Control Points (HACCP) in a Food Plant. The Association of Professional Engineers of Trinidad and Tobago.Vol.36, No.1, pp. 32-37.
15. **Food Safety System Certification, FSSC 22000 (2019).** Guidance document: ISO 22000:2018. Interpretation.
16. **El-Rouby, M. Z ;H. E. Bahlol ;A. I. El-Desouky ; A. M. Sharoba and A. H. Darweesh.(2020).** Implementation of ISO 22000 System in Spaghetti Industry. Food and Dairy Sci., Mansoura Univ., Vol 11 (12) : 321–329.

17. **Gary ,G.H.(2010).** Asian Noodles Science.Technoloy. and Processing. Published by John Wiley & Sons, Inc., Hoboken, New Jersey. Published simultaneously in Canada.Pp350-412.
18. **Fahad, J.; Hossain,S.; Al-Emran, and Uddin,N. (2022).** Implementation of HACCP Management System in a Cake Manufacturing Company in Dhaka, Bangladesh: A Case Study. Journal of Food Quality, Volume 2022, 12 pages.
19. **Codex Alimentarius committee**. **CAC (2023).** (Food and Agriculture Organization of the United Nations World Health Organization). Food Hygiene Basic Texts. FAO, Rome, Secretariat of the Joint FAO/WHO Food Standards Programme.
20. **E.S, Egyptian Standard Specifications, 4767 (2005)** for Instant noodels.
21. **El-Bayoumi,M.M ; Y.A. Heikal ; Salwa, M. Abo-El-Fetoh and M. M. Abdel- Razik.(2013).** Implementation of ISO 22000 as a Food Safety Management Tools in Wheat Milling Industry. Dairy & Food Sciences., 8 (1): 27-37.
22. **NFSA, National Food Safety Authority. (2021a).** Authority Board of Directors Resolution No.1 of 2021. Concering the binding technical rules for microbiological standareds for foodstuffs.
23. **Larisa, C. and Man, L., (2020).** Functional Ingredients in Asian Noodle Manufacturing, South Perth, WA, Australia China. Pp25-42.
24. **Danar, A.S.; Suef, M. and Putu, D.K. (2023).** Level of implementation of GMP and SSOP in SMEs wet noodle production process with gap analysis tools. Novel Carbon Resource Sciences & Green Asia Strategy, Vol. 10, Issue 01, pp510-518.
25. **Anis, A.S. and M.D. Abdul Alim. (2017).** Design of HACCP plan for biscuit industry in Bangladesh. Elixir Food Science., 105 : 46070-46077.
26. **Zakharova, L.M and Gorbunchikova, M.S.(2021).** Food product quality and safety control based on HACCP principles. Earth and Environmental Science.,845 (2021) 012125.
27. **Xiaowei, F.; Huang, B. and Yu, W.(2016).** Research article using HACCP to control hazards in fresh noodles processing line. Food Science and Technology. 10(10): 721-725.