Fisheries Journal, 15 (5), 2350-2362 (2025)
http://doi.org/10.29303/jp.v15i5.1488

PROCESSING AND FOOD SAFETY OF WHOLE CLEAN CUTTLEFISH (*Sepia sp.*) FROZEN WITH THE IMPLEMENTATION OF GMP AND SSOP

Pengolahan dan Keamanan Pangan Produk Whole Clean Cuttlefish (*Sepia sp.*) Beku Dengan Penerapan GMP dan SSOP

Pola Sabar Tumohom Panjaitan*, Sandy Saputra, Rahmad Surya Hadi Saputra, Liliek Soeprijadi, Agusta Putri Balqis Linda Soeharso, Budi Sulistiyo, Trisna Ningsih

Fishery Product Processing Technology Department, Polytechnic Marine Affairs and Fisheries Karawang

Tanjung Pura Circle Km. 3 Karangpawitan Karawang West Java 41315

*Corresponding Author: polapanjaitan@ymail.com

(Received March 25th 2025; Accepted October 2th 2025)

ABSTRACT

Indonesia has vast potential in aquatic resources, particularly in marine areas. One of the leading fishery commodities is cuttlefish, which is widely found in the Indonesian archipelago waters. This study aims to examine the characteristics of frozen Whole Clean Cuttlefish products processed based on the principles of Good Manufacturing Practices (GMP) and Standard Sanitation Operating Procedures (SSOP). The implementation of GMP and SSOP is crucial to ensure the quality and safety of fishery products, considering the perishable nature of fish as raw material. Therefore, enhancing food safety standards is essential to maintain the quality of frozen Whole Clean Cuttlefish, ensuring it remains safe and suitable for consumption by the public.This study was conducted through direct observation at a fishery processing unit that applies GMP and SSOP standards throughout all stages of production, starting from the reception of raw materials, washing, gutting, packaging, to freezing and storage. The method used was a descriptive approach through systematic observation and documentation of the process. Observations showed that consistent implementation of GMP and SSOP can maintain product quality in terms of physical, chemical, and microbiological aspects. The resulting products meet the established quality standards and have a longer shelf life.The application of GMP and SSOP in the processing of frozen Whole Clean Cuttlefish plays a vital role in maintaining product quality and safety. These findings are expected to serve as a reference for fishery processing industry players in improving product quality and building consumer trust in frozen seafood products from Indonesia.

Key Word: Cuttlefish, Whole clean, GMP, SSOP

ABSTRAK

Indonesia memiliki potensi sumber daya perairan yang sangat besar, khususnya di wilayah laut. Salah satu komoditas perikanan unggulan adalah sotong (*cuttlefish*) yang banyak ditemukan di perairan nusantara. Penelitian ini bertujuan untuk mengkaji karakteristik produk Whole Clean Cuttlefish beku yang diproses berdasarkan prinsip *Good Manufacturing Practices* (GMP) dan *Standard Sanitation Operating Procedures* (SSOP). Penerapan GMP dan SSOP menjadi hal krusial untuk menjamin mutu serta keamanan produk perikanan, mengingat sifat bahan baku ikan yang mudah rusak. Oleh karena itu, peningkatan standar keamanan pangan sangat diperlukan guna menjaga kualitas produk Whole Clean Cuttlefish beku agar tetap aman dan layak dikonsumsi oleh masyarakat. Penelitian ini dilakukan melalui pengamatan langsung di unit pengolahan hasil perikanan yang menerapkan standar GMP dan SSOP dalam seluruh tahapan produksi, mulai dari penerimaan bahan baku, pencucian, pengeluaran isi perut, pengemasan, hingga pembekuan dan penyimpanan. Metode yang digunakan adalah pendekatan deskriptif dengan observasi dan dokumentasi proses secara sistematis. Hasil pengamatan menunjukkan bahwa penerapan GMP dan SSOP secara konsisten mampu menjaga kualitas produk, baik dari segi fisik, kimia, maupun mikrobiologis. Produk yang dihasilkan memenuhi standar mutu yang ditetapkan, serta memiliki daya simpan yang lebih panjang. Penerapan GMP dan SSOP dalam pengolahan Whole Clean Cuttlefish beku berperan penting dalam menjaga mutu dan keamanan produk. Temuan ini diharapkan dapat menjadi acuan bagi pelaku industri pengolahan hasil perikanan dalam meningkatkan kualitas produk dan kepercayaan konsumen terhadap produk laut beku asal Indonesia..

Kata Kunci: Sotong, Whole clean, GMP, SSOP

INTRODUCTION

Cuttlefish (*Sepia* sp.) has high nutritional value, especially unsaturated fatty acids, making it a significant commodity in both domestic and international trade. According to export data from the Ministry of Marine Affairs and Fisheries, compiled by the Central Bureau of Statistics, during the period from January to March 2020, squid, cuttlefish, and octopus were among Indonesia's main fishery export commodities, with export value increasing to USD 131.94 million, or 10.63% of the total national fishery export value (Rohmah & Ayu, 2022).

The government issues industrial permits in the processing sector through various ministries and agencies. The goal is to ensure that every product produced by the industry is competitive in both domestic and international markets while meeting safe quality standards for consumption. Therefore, the issuance of permits is based on food safety standards and guarantees for consumers, and business operators must be able to implement the Sanitation Standard Operating Procedure (SSOP) and Good Manufacturing Practices (GMP).(Elvince et al.,2022).

Good management in handling fishery products is essential to ensure optimal product quality, one of which is by implementing Good Manufacturing Practices (GMP) and Sanitation Standard Operating Procedure (SSOP). GMP and SSOP are the main systems in food processing aimed at maintaining stable quality and ensuring food safety, from raw materials to ready-to-consume products. Therefore, the implementation of GMP and SSOP in accordance with standards is crucial to guarantee the safety and quality of food products (Panjaitan et al., 2024).

PT. Dua Putra Utama Makmur is a company engaged in the fisheries sector, producing premium-quality seafood that is exported to various countries. One of the fishery products processed at PT. Dua Putra Utama Makmur, made from cuttlefish, is Whole Clean. Whole Clean is a whole cuttlefish processed using freezing technology to maintain quality and extend

its shelf life. In the processing of fishery products, in addition to the accuracy of processing methods, the implementation of food safety requirements is also essential to produce high-quality and safe products for consumption.

RESEARCH METHODS

Time and Place

This research was conducted from October 18, 2024, to January 5, 2024, at PT. Dua Putra Utama Makmur, located on Jalan Raya Pati-Juwana No. KM.7, Pondohan, Purwerejo, Pati District, Pati Regency, Central Java.

Tool And Material

Knives, sharpeners, baskets, tables, bench scales, digital scales, cold storage, contact plate freezer (CPF), trolley, forklip. testing score sheet organoleptic material standard according to SNI 6926.2 : 2011. And Raw Material Cuttlefish, water and ice, material packer plastic polyethylene as primary packaging.

Data Analysis Methods

Observation begins acceptance material raw material until loading. Testing organoleptic with 20 (twenty) repetitions. Data analysis descriptive with scoresheet material standards according to SNI 6926.2 : 2011 and products final company standard, for assessment basic feasibility of the processing unit done based on KP Ministerial Regulation Number 17/PERMEN-KP/2019 (KKP, 2019).

RESULT

Table 1 Observation 1: Organoleptic Test

Panelist	Observation 1			
	Parameter			
	Appearance	Smell	Texture	Average
sandy	9	7	7	7,7
raihan	9	9	7	8,3
jesika	7	7	7	7,0
nadhifa	9	8	9	8,7
Jumlah				31,7

Table 2 Observation Results of Raw Material Testing

No	Nilai Interval	Nilai Organoleptiknya	Standar
1	7,1 ≤μ≥ 8,6	7	
2	7,5 ≤μ≥ 9,1	7,5	
3	7,9 ≤μ≥ 8,8	8	
4	8,0 ≤μ≥ 9,0	8	
5	7,7 ≤μ≥ 9,3	8	
6	8,0≤μ≥ 9,0	8	
7	7,5 ≤μ≥ 8,9	7,5	
8	7,2 ≤μ≥ 7,8	7	
9	7,5 ≤μ≥ 8,9	7,5	7
10	7,8 ≤μ≥ 8,5	8	
11	7,0 ≤μ≥ 8,3	7	
12	7,6 ≤μ≥ 9,2	8	
13	7,5 ≤μ≥ 8,6	7,5	

14	7,7 ≤μ≥ 9,3	8
15	7,4 ≤μ≥ 8,5	7
16	8,4 ≤μ≥ 9,0	8
17	7,4 ≤μ≥ 8,6	7
18	7,5 ≤μ≥ 9,1	7,5
19	7,8 ≤μ≥ 8,8	8
20	7,7 ≤μ≥ 9,3	8

Table 3 Findings GMP & SSOP non-conformity

1.	**INCOMPATIBILITY**	
a.	Critical	0 Findings
b.	Are You Serious	0 Findings
c.	Major	0 Findings
d.	Minor	0 Findings
2.	SKP RATING	1. A (Very good)√ 2. B (Good) 3. C (Fair)

Picture 1. Raw Material Cuttlefish

DISCUSSION

Whole clean Cuttlefish Production Process Frozen

1. Receiving Raw Material

The raw material reception at PT. Dua Putra Utama Makmur comes from catches in the waters around TPI Juwana, as well as supplies from local fishermen. The selection of cuttlefish as a raw material for production is based on buyer demand. The availability of raw materials is a crucial factor in ensuring a smooth production process. Raw materials are procured through direct purchases from fishermen after the company conducts a port survey to assess the feasibility of the raw materials (cephalopods) to be processed. If the raw materials meet the required criteria, price negotiations are carried out based on the factory market price. Once an agreement is reached, payment is made directly to the suppliers.

The raw materials received at the port are stored in fiber boxes filled with ice to maintain their quality and freshness. The raw materials are then transported using pick-up trucks owned by PT. Dua Putra Utama Makmur. Suppliers come from various regions, including Probolinggo, Lamongan, Jakarta, and Pasuruan, to ensure the continuity of raw material supply.

For direct purchases from fishermen, transportation of raw materials is usually carried out using trucks or pick-ups equipped with fiber boxes filled with ice. This method helps maintain the cuttlefish within the cold chain to preserve its freshness. Meanwhile, raw materials sourced directly from other companies are transported using containers.The raw cuttlefish used at PT. Dua Putra Utama Makmur must meet the following criteria:

a) No foul odor.
b) Bright body coloration.
c) Cephalopod body remains intact.

Before proceeding to the next process, the raw material temperature is first checked to ensure it meets the standard of ≤ 5°C. This temperature control is part of the SSOP, aimed at maintaining the freshness and nutritional content of the fish by slowing down the activity of spoilage bacteria and biochemical processes that could degrade its quality (Ristiyanti & Masithah, 2021).

2. Sorting

Each cuttlefish is individually checked for odor and weighed. The weighing results are used for sorting based on size, grade, odor, and product defects. The cuttlefish are categorized into four size groups:

1. Size 31-40 with a weight of 25-30 grams
2. Size 41-60 with a weight of 17-25 grams
3. Size 61-80 with a weight of 12-17 grams
4. Size 81-120 with a weight of 8-12 grams

The sorting process aims to separate the cuttlefish based on species, organoleptic quality, and size.

This process is carried out to classify the cuttlefish based on market targets and buyer demands. The grading of cuttlefish is categorized as follows:

1. First Grade**:** This refers to raw materials in the best condition or with the highest specifications. The raw materials are intact (no loss of yield), the skin is undamaged or not torn, the flesh has a firm texture, the cuttlefish has a characteristic odor, the color is specific to cuttlefish and not pale, and the eyeballs remain unbroken.
2. Second Grade: This includes raw materials with minor defects, such as torn skin due to handling during capture on fishing vessels.
3. Reject / Below Standard (BS): This category includes raw materials in poor condition or with unacceptable specifications, such as physical defects, non-elastic flesh texture, pale skin color, and an odor that is not characteristic of fresh fish (indicating quality deterioration), making them unsuitable for processing.

The sorting process at PT. Dua Putra Utama Makmur complies with the SNI 6926.2:2011 standard for frozen whole cuttlefish (*Sepia* spp), Part 2: Raw Material Requirements. This process ensures that the raw materials meet the specified standards. Sorting is carried out quickly, accurately, and hygienically while maintaining the cold chain using ice flakes.

3. Washing 1

He washing process is carried out by dipping a basket containing cuttlefish into a tank filled with 100-200 ppm chlorine water for 20 seconds, followed by rinsing with non-chlorinated water. The purpose of this washing process is to remove dirt from the surface of the cuttlefish before the quality and size sorting process, as well as to reduce the number of bacteria present.

Ice is added during the washing process to maintain the freshness of the cuttlefish. The temperature during washing is kept at **<5°C**. If the temperature exceeds this limit, ice is added to bring it back within the specified range.

4. Weighing 1

   After the raw materials are washed with 100-200 ppm chlorine water, the weighing process is carried out to ensure that the total weight matches the net weight sent by the supplier and is not less than the required amount. The weighing results also serve to confirm the weight specified by the supplier and determine the composition of the salt solution to be prepared for the next process, which is soaking (Manage et al., 2017).

   The weighing process is conducted using baskets and digital scales. Digital scales are preferred as they are considered more accurate and have a modern design compared to analog scales .

   After weighing, the labeling process is carried out to include information regarding the size of the cuttlefish in each basket. The labels used must be clean, easy to read, waterproof, and resistant to damage or tearing.

5. Brine spinning 1

   Soaking is the process of adding a salt solution to bind water to the frozen whole cuttlefish, causing it to expand and increase in weight. Additionally, this process helps to brighten the color, improve texture, and enhance the elasticity of the product. For frozen whole cuttlefish, a 3% salt solution is used, and the temperature is monitored to remain below <5°C (Ristiyanti & Masithah, 2021) for 15 minutes.

6. Cleaning

   Cleaning is the process of removing the intestines, eyes, and gums of the cuttlefish while ensuring that the skin, fins, body, and head remain intact. During the cleaning process, the raw material (RM) must be submerged in cold water with added ice flakes, maintaining the water temperature at <4°C to preserve the quality of the raw material. This aligns with the statement by (Vatria & Pontianak, 2020), which emphasizes that maintaining fish freshness requires applying low temperatures close to 0°C from production to the consumer.

7. Washing 2

   Second Washing is carried out by washing the cuttlefish with 30-50 ppm chlorine water for 20 seconds, followed by rinsing with non-chlorinated water. The water temperature must be maintained at ≤ 5°C (Ristiyanti & Masithah, 2021).

8. Brine spinning 2

   The raw material must be fully submerged in cold water at a temperature of ≤ 5°C, with the addition of a 3% salt solution to help retain water in the frozen whole cuttlefish. This process causes the cuttlefish to expand, increasing its weight while also enhancing its color, texture, and elasticity. Additionally, the temperature is monitored to ensure it remains below <5°C (Ristiyanti & Masithah, 2021)for 15 minutes.

9. Washing 3

   Third Washing is carried out by washing the cuttlefish with 10-30 ppm chlorine water for 20 seconds, followed by rinsing with non-chlorinated water. The water temperature must be maintained at ≤ 5°C (Ristiyanti & Masithah, 2021).

10. Quality grading

    Quality grading is performed by individually checking the odor and sorting the cuttlefish based on its quality grade. The raw material (RM) must remain submerged in cold water at a temperature of ≤ 5°C. If the water temperature exceeds the standard limit or is not sufficiently cold, ice flakes are added to maintain the cold chain system.

11. Weighing 2

    Second Weighing is carried out after the quality grading process to determine the weight after the soaking process. The weighing must be conducted quickly, accurately, and hygienically to prevent cross-contamination.

12. Final Checking

    After the second weighing process, a final inspection is carried out by weighing each piece individually according to its size, ensuring that the raw material (RM) remains submerged in cold water at all times. Defective products and foreign objects (filth) must be removed to prevent product rejection.

13. Washing 4

    Fourth Washing is carried out by washing the cuttlefish with 5-10 ppm chlorine water for 20 seconds, followed by rinsing with non-chlorinated water. The water temperature must be maintained at ≤ 5°C (Ristiyanti & Masithah, 2021).

14. Draining

    After the fourth washing process, draining is done using a perforated pan. Wait until the excess water has drained, then proceed to the next process, arranging.

15. Arranging on pan

    The arranging of cuttlefish is done based on the sorting results according to size categories: size 31-40, size 41-60, size 61-80, and size 81-120. The cuttlefish are carefully arranged on a long pan to maintain their texture and appearance, preventing any damage. Afterward, 200 ml of ice water at a temperature of ≤ 5°C is added to prevent dehydration during the freezing process.

16. Frezzing CPF

    The cuttlefish, which has been arranged in the pan, is then frozen using the Contact Plate Freezing (CPF) method for six hours until the temperature reaches -35 to -40°C (Savira, 2018). This freezing process is facilitated by a refrigerant, specifically freon, which is chosen for its efficiency and ease of use as a cooling agent (Yulianti, 2017).

    The advantages of the CPF method include good economic value, efficient space utilization, low operational costs, and minimal dehydration levels. Additionally, the defrosting process occurs at a very low rate. However, a limitation of the CPF method is that it is only effective for freezing uniformly sized and block-shaped products (Sasmita, 2019).

17. Glazing

    The glazing process for frozen cuttlefish is carried out by dipping the product in water twice, with the addition of ice to maintain a temperature of ≤ 5°C. Glazing serves to prevent oxidation, dehydration, and improve appearance by forming a thin, uniform ice layer (Zulfikar, 2016)

    This ice layer acts as a barrier between the product and the surrounding air, helping to retain moisture and preserve freshness. Dehydration occurs due to moisture evaporation from the product's surface during low-temperature storage, a phenomenon known as freezer burn. This can cause the product to become dry, tough, and of lower quality.

    Additionally, oxidation happens when oxygen reacts with components in the product, especially fats and pigments, leading to color changes and the development of a rancid odor.

18. Weighing 3

    After the glazing process, the final weighing is carried out, ensuring a weight of 1 kg per bag.

19. Packing (in bag) and sealing

    After the third weighing process, the frozen cuttlefish undergoes the packaging process, where the product is placed into polybags using a stainless steel funnel to facilitate packaging. The packaging process is carried out quickly and carefully, as this is considered primary packaging.The primary packaging used for frozen cuttlefish is PE (Polyethylene) nylon plastic with dimensions of 25 x 35 cm and a thickness of approximately ±6 mm.

20. Metal detecting

    In the final product (finished goods), metal detection is performed according to (Tasbih, 2024) The types of metals detected include Fe/Iron with a standard of 1.5, SUS/Stainless Steel with a standard of 2.5, and AI/Aluminum with a company standard of Metal detection plays a crucial role as the final quality assurance step to ensure the product is free from hazardous contaminants, especially metal. Before the metal detection process, the Quality Control (QC) officer checks the metal detector and adjusts its specifications according to the product, as the product thickness varies. This adjustment ensures that the metal detector can accurately detect metal contaminants in the product.

21. Labelling

    Packaging and labeling are carried out after the metal detection process, using a master box carton with code 00125, containing 10 bags per carton as secondary packaging. The function of secondary packaging is to protect the primary packaging from impacts, pressure, and environmental conditions such as temperature or humidity, as well as to facilitate transportation (Julianti, 2014).

22. Cold storaging

    Products that have been packed in master cartons (MC) are transferred using trolleys and stored in cold storage at a temperature of -18°C to -25°C, following the frozen product storage standards(Kusnandar, 2021). The storage process continues until the product quantity meets the buyer's demand. Technically, cold storage operates using a compressor, condenser, evaporator, and refrigerant. The compressor compresses the refrigerant, the condenser releases heat, and the evaporator absorbs heat from the storage area, ensuring a stable and low temperature to maintain product freshness.This storage process aims to preserve quality and extend the product’s shelf life. The First In, First Out (FIFO) principle is applied, meaning that the first products placed in storage are also the first to be distributed, preventing older products from being delayed in the distribution process.

23. Stuffing

    Loading or stuffing is the process of transferring products from cold storage into containers for further distribution (Prasetyo, 2022). The distributed products are intended for the Japanese market, with the container temperature maintained at -20°C.

Implementation of Good Manufacturing Practice

1. Location and Building

    PT. Dua Putra Utama Makmur is located at Jln Raya Juwana-Pati No. KM.7, Pondohan, Purworejo, Kec. Pati, Kab. Pati, Central Java. The company's location is right by the roadside, ensuring easy transportation access to the facility. The company environment is enclosed by a concrete fence, which serves to prevent pests from entering, enhance security, and control access to the premises. Additionally, the facility is equipped with a drainage system that prevents water accumulation, which could otherwise become a breeding ground for insects. The cleanliness of the company’s

surroundings is maintained daily, ensuring that waste, bushes, and wild grass—potential hiding places for pests—are regularly removed. The premises are also kept free from animals such as cats, dogs, and others.

The building structure of PT. Dua Putra Utama Makmur is well-organized and appropriately designed. The layout and design align with the process flow, starting from raw material reception to final product storage. Clean and dirty areas are clearly separated by partition walls, and the raw material entry door is distinct from the final product exit door. The production areas include the receiving area, washing area, sanitation area, production area, arrangement area, packaging area, and storage area, ensuring an efficient and hygienic workflow.

2. Door

   The doors in the processing unit are made of water-resistant materials and are designed to be tightly sealed without any gaps when closed. Each door is also equipped with a plastic curtain to prevent insects from entering. Before entering the production area, there is a handwashing sink equipped with a foot-pedal-operated faucet and soap. Additionally, a footbath containing a 100-200 ppm chlorine solution is provided to ensure employee hygiene before entering the production area.

3. Floor

   The floor surface in the processing unit area is designed to be smooth, level, and easy to clean. The floor is coated with epoxy to ensure water resistance, a non-slip surface, and high durability. Additionally, the floor is constructed with a slight slope towards the drainage system to prevent water pooling and facilitate the cleaning process. The floor color is yellow to create a clear contrast, making it easier to detect dirt, materials, or objects that may fall onto the floor.

4. Wall

   The walls in the processing unit have a smooth, even surface that is water-resistant, non-peeling, crack-resistant, and easy to clean. The walls are made of panel materials and painted white to make dirt easier to detect and to enhance lighting. Additionally, the junctions between walls and between walls and the floor are designed without dead angles, making the cleaning process more efficient.

5. Roof/ceiling

   The ceiling or roof in the processing unit is made of non-peeling materials and designed to minimize dirt accumulation. Additionally, the ceiling is equipped with blowers to prevent condensation. Its surface is smooth, even, and bright white to enhance lighting effectiveness.

6. Ventilation

   The ventilation system in the processing unit is equipped with blowers to prevent condensation in each room and to optimize air circulation within the facility.

7. Lightning

   Each production room at PT. Dua Putra Utama Makmur is equipped with adequate lighting. The lamps used are long-type lamps with protective covers.

8. Channel disposal

   The processing unit is equipped with drainage channels distributed throughout the production area to prevent water pooling and facilitate sanitation processes. These channels are designed to prevent contamination, with the flow directed from clean areas to less clean areas. Each drainage hole is also fitted with a cover to prevent the entry of pests. The selection of the location and structural elements of the processing unit at PT. Dua Putra Utama Makmur complies with the standards set in the Regulation of the Minister of Maritime Affairs and Fisheries No. 17 of 2019.

9. Installation Waste Water Treatment (IPAL)

   PT. Dua Putra Utama Makmur has an adequate Wastewater Treatment Plant (WWTP). Liquid waste is directly discharged into the drainage system after undergoing a special treatment process.

Standard Sanitation Operating Procedure (SSOP)

1. Water and ice safety

   The water used for all processing activities at PT. Dua Putra Utama Makmur comes from PDAM. This PDAM water is first processed using filtration technology with a nano filter machine to produce drinking water standard quality, ensuring its safety for processing and for making ice used during production. The quality of water and ice, including color, odor, and taste, is checked daily, and microbiological testing is conducted in the internal laboratory, covering TPC, E. coli, coliform, and Salmonella.

2. Sanitation

   Daily maintenance is carried out to ensure the cleanliness of equipment and surfaces that come into direct contact with food in the processing unit, preventing contamination from surfaces or equipment due to inadequate hygiene. Before production activities begin, all production equipment and surfaces are inspected for cleanliness and suitability. If any equipment is found to be damaged or rusty, it will be immediately replaced with new or well-maintained equipment.

   After the production process is completed, all surfaces and equipment are sanitized using a sodium hypochlorite solution of 50–100 ppm, followed by rinsing with clean, running water. Additionally, swab tests are conducted three times a week on all surfaces and equipment that come into direct contact with food, testing for TPC, E. coli, and coliform. This microbiological testing serves as a control and preventive measure against microbial contamination from surfaces or equipment to food products. If microbiological test results exceed the acceptable limit on any surface or equipment, an investigation is immediately conducted to determine the cause. The issue is reported to the relevant department for corrective actions, such as replacing or thoroughly cleaning the equipment to ensure proper hygiene is maintained.

   During the packaging and labeling stage, the suitability of the packaging materials is checked beforehand. Packaging materials must be in proper condition, undamaged, and clean to prevent contamination of the product and ensure maximum protection. If the packaging materials are found to be damaged, they are immediately replaced with new or well-maintained ones.

3. Cross contamination

   Cross-contamination occurs when biological or chemical contaminants from external sources are introduced into fishery products. It can be caused by employees, raw materials, equipment, animals, or the processing unit environment. To prevent cross-contamination, PT. Dua Putra Utama Makmur implements several measures, including a facility layout designed to prevent contamination by separating specific processing areas, raw material receiving areas, packaging rooms, and storage areas. This layout is structured according to the production flow to prevent raw materials from contaminating each other at different processing stages. The movement of products, employees, and equipment within each room is strictly regulated, and all equipment is specifically marked for designated areas to ensure proper use.

   Strict regulations apply to all employees working in the processing unit, requiring them to wear complete personal protective equipment (PPE), prohibiting eating and drinking, wearing jewelry, or bringing unauthorized items into the processing area. Employees must wash their hands and sanitize their footwear in a

footbath before entering the processing unit to prevent cross-contamination from external contaminants. Additionally, during processing, employees are required to wash their hands and sanitize equipment every 30 minutes.

4. Sanitation employee

   Daily maintenance is carried out to ensure the cleanliness and proper functioning of sanitation facilities, handwashing stations, and toilets, helping to maintain hygiene for both employees and the processing unit environment.

   A handwashing station is available before the entrance to the processing unit, equipped with a foot-pedal-operated faucet and soap to maximize sanitation and hygiene. The toilet facilities are separated for men and women, with each toilet equipped with soap, tissue, and a handwashing station to support hygiene maintenance. Toilets are located outside the production area to prevent contamination. All sanitation facilities are cleaned regularly every day and maintained by sanitation staff to ensure cleanliness and proper function. When soap or tissue runs out, it is immediately replenished by the sanitation staff.

5. Prevention mixing toxix material

   During the production process, products must be protected from contaminants. Contaminants may include chemicals, soap, and disinfectants. All contaminants are stored in a designated storage room separate from the production area.

   Product packaging materials, which are food-grade, are stored in a dedicated room and protected from biological, chemical, and physical contamination. A visual inspection of contaminant materials is conducted daily, and if any materials do not meet the standards, immediate corrective action is taken. Additionally, the storage area for contaminants is inspected daily to ensure cleanliness and organization.

6. Storage and Labeling

   Toxic materials are stored in a designated room, categorized according to their type, and labeled with accurate information. Only trained and authorized employees are permitted to enter the toxic material storage room and use the substances in compliance with established standards. Each use of toxic materials is recorded by authorized personnel for monitoring purposes.

   The storage room is inspected daily to ensure cleanliness and organization. The condition of labels and packaging is also monitored—if damaged, they must be replaced immediately. When toxic materials become unusable or expired, they are promptly removed from storage and disposed of safely while ensuring environmental protection.

7. Employee health

   Employee health conditions are continuously monitored, especially before entering the production area. Health monitoring is also carried out during the production process. If an employee is unwell, they are not allowed to work to prevent contamination from the sick employee to food products.During processing activities in the production unit, if an employee falls ill, they must immediately report to Quality Control (QC) and will be handled according to company procedures.

8. Control of nuisance animal (Pest control)

   Animals and insects are potential sources of contamination in the fish processing unit, requiring special pest control measures. PT. Dua Putra Utama Makmur implements various efforts to control pests within the company premises, such as constructing a perimeter wall around the facility, installing insect killer machines in every production room connected to the outside, and ensuring that all external penetrations, such as pipes and drainage channels, are equipped with covers. After production activities are completed, all doors and openings in the processing unit are

securely closed. Rodent and pest traps are placed at specific points around the company area. Additionally, environmental control measures are taken by maintaining cleanliness and removing bushes, stagnant water, and waste to prevent pest infestation.

CONCLUSION

The implementation of Good Manufacturing Practice (GMP) and Standard Sanitation Operating Procedure (SSOP) in the frozen Whole Clean Cuttlefish production has been carried out optimally, as indicated by the absence of serious findings, major findings, and minor findings. The Whole Clean Cuttlefish product itself has an organoleptic score exceeding 7 and meets the standards for cuttlefish raw material acceptance.

ACKNOWLEDGEMENT

The author say a big thank you for the cooperation of various parties that we cannot convey one by one on this occasion. We also say thank you Director Polytechnic Karawang Maritime Affairs and Fisheries along with its ranks have give the next opportunity for this research to be published.

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