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Application of GMP and SSOP to the Production of Natural CO Frozen Red Kakap (*Lutjanus* sp.) Fillets at PT. Alam Jaya Surabaya

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ABSTRACT

According to BKIPM-KKP data, throughout 2022 – 2023, there were 29 cases or 0.028% of the total 102,570. The reason was the finding of heavy metal contents such as mercury that exceeded the threshold, namely 2 cases in Germany and 2 cases in France. One of the considerations for consumers when choosing products to consume is ensuring that the food produced is safe for health and guarantees cleanliness. Implementing suitable production methods and sanitation procedures is based on standard guidelines, namely *Good Manufacturing Practices* (GMP) and Standard *Sanitation Operating Procedures* (SSOP). This research aims to determine the GMP and SSOP of frozen red snapper fillets. The methods used were observation, interviews, and active participation. The results of implementing the cold chain are by standards; the yield calculation results follow company standards, namely 43-44%, and the results of GMP and SSOP analysis have met the standards of PERMEN KP Number 17 of 2019.

INTRODUCTION

Red snapper (Lutjanus *sp*.) is a marine fisheries commodity with a high selling value. According to Yuwono (2015), red snapper (Lutjanus sp.) has nutritional content per 100 grams of protein 20 grams, fat 7 grams, calcium 20 grams, phosphorus 20 mg, vitamin 9 mg, iron 1 mg, and water 77 mg so it is perfect for human consumption. The high protein content in red snapper causes the fish to be included in perishable commodities (*Perishable Food*). Efforts to maintain the freshness and durability of red snapper from spoilage within a certain period can be made by freezing (Siregar, 2021). Freezing fish as a method of processing fishery products to preserve food is based on inhibiting the growth of microorganisms and restraining chemical reactions and enzyme activity (Siregar, 2021). The freezing process aims to reduce bacterial growth and enzyme reaction rate by converting the fish body's water into ice grains at a temperature of -10^{o}C or lower (Hakim, 2020).

PT Alam Jaya is a fish and seafood freezing company. One of its products is frozen CO red snapper fillets, which aim to maintain the cherry red colour of the meat (Djenane & Roncales, 2018).

This research is motivated by the fact that red snapper in the form of frozen fillets has a fairly good market for export to destination countries, both Asia and Europe, and the aim of this research is to determine whether the production process is running well according to regulations so that a product that is safe for consumption is obtained.

LITERATURE REVIEW

Observation of Operational Implementation GMP and SSOP

Process Flow Observation

The processing of frozen natural CO red snapper fillets at PT Alam Jaya applies GMP and SSOP according to SNI 2696: 2013 concerning the handling and processing of frozen fish fillets used in natural CO red snapper fillets and frozen with the addition of several processes such as combing, thorn removal, final checking, sizing, CO treatment, packaging and vacuum, weighing, and metal detection. The processing process of frozen natural CO red snapper fillets goes through several stages, such as receiving raw materials, sorting, conditioning, washing I, filleting, thorn removal and trimming, final checking, sizing, weighing, washing II, CO treatment, wrapping and vacuum, preparation in pan, freezing, weighing III, metal detection, packaging and labeling, storage, stuffing. At each stage, various aspects of quality are observed to produce a final product that meets the standards and demands of the buyer.

The process flow of freezing Cuckang (Muraenesox cinerus) fish fillets starts from the process of receiving raw materials, weighing I, weeding, washing, sorting, weighing II, cutting the head, tail and fins, weighing III, milling, weighing IV, arranging in pans, freezing, packaging and labeling, storage in cold storage, and distribution (Panjaitan, 2024)

UPI Physical Assessment

Assessment of basic eligibility requirements in the form of physical requirements assessment includes physical and operational requirements that the processing unit has implemented. The assessment is carried out by filling out a processing feasibility certificate questionnaire and then providing suggestions if there are things that must be improved in the processing unit. Observation of the basic feasibility assessment is carried out twice (at the beginning and the end of the observation.

Good Manufacturing Practices (GMP)

Good Manufacturing Practice (GMP) explains how to produce high-quality, safe, and suitable food. GMP is a procedure for conducting good production,

implementation procedures, and controlling and supervising the production process implementation. The processing stage is a big problem because the sanitation of processing equipment and workers is essential in producing high-quality and safe food products for consumption (Herdhiansyah, 2021).

GMP is a reference for producing well and correctly and is the main requirement before a food industry can obtain HACCP (Hazard Analysis Critical Control Point). Excellent and correct production methods are observed by observing and carrying out direct activities in processing frozen natural CO snapper fillets. The observed aspects include raw materials, auxiliary materials, additives, handling methods, processing methods, chemicals, packaging, storage, and distribution.

Standard Sanitation Operating Procedure (SSOP)

SSOP is a standard for implementing processing principles that must be met by a fish processing unit (UPI) to prevent contamination of processed products through sanitation and hygiene activities. Sanitary and hygiene techniques are all activities related to efforts to maintain/supervise cleanliness and health in the production process and distribution of fishery products to create hygienic fishery product processing conditions with the ultimate goal of producing hygienic finished products (Triharjono, Probowati, & Fakhry, 2013).

SSOP processing is observed by conducting direct observations in the processing room. This includes location and environment, design and construction of buildings/facilities, design and construction of equipment, water and ice supply, waste treatment, employee hygiene, changing rooms and toilets, cleaning and sanitizing procedures, chemicals, sanitary ware, and pest control.

Temperature Observation

Temperature observations were made by measuring the temperature of the product, washing water, and processing room 20 times using a thermometer. Product temperature observations were made at receiving raw materials, filleting, trimming, and packing.

Observing washing water temperature is carried out using a thermometer, which is directed into the water at the washing I and washing II stages.

Room temperature is observed by looking at the temperature on the temperature control device located on the wall of the process room. Room temperature observations were made in the raw material reception room, process room, fillet room, CO room, packing room, anteroom, ABF, and Cold Storage. After obtaining the results of many measurements, the average is calculated to determine the final result.

METHOD

The research was conducted from September 2023 to December 2023 at PT Alam Jaya Surabaya, East Java. The tools used in the freezing process of frozen natural CO red snapper fillets are plastic baskets, digital scales, a long pan, tweezers, knives, a stroller, a fiber box, a washing tub, a cooling machine, and a metal detector. The materials used in the freezing process of natural CO-frozen red snapper fillets are fresh red snapper, ice flakes, water, chlorine, laundry soap, and carbon monoxide (CO).

Data collection using observation, interview, and active participation methods. Observation is carried out by directly observing each process of activities in the field; interviews are carried out by conducting question-and-answer interactions with company parties such as HRD managers, quality supervisors, production supervisors, heads of production, heads of sanitation, and permanent employees and active participation in production activities directly.

RESULT AND DISCUSSION

Processing Process of Frozen Natural CO Red Snapper Fish Fillets

Processing stages of frozen natural CO red snapper fillets:

1. Receiving Raw Material

Table 1. Organoleptic Test Averages

Parameters	Panels					
	1	**2**	**3**	**4**	**5**	**6**
Eye	8	9	8	8	9	8
Gills	8	8	9	8	8	8
Mucus	8	8	7	7	8	8
Meat	8	8	8	8	8	8
Smell	8	9	8	8	8	8
Texture	8	8	8	8	8	8
Average	8	8,3	8	7,8	8,1	8
Total Average	**8,03**					

The raw materials of red snapper (Lutjanus sp.) are fresh and intact, meet the specified standards and specifications, and undergo organoleptic testing using a scoresheet. Checks were made on eyes, gills, mucus, meat, odor, and texture, with an average result of 8.03.

2. Sorting

The sorting process separates the fish according to size and grade to facilitate production. Based on the target market and buyer demand, there are three red snapper raw material grades.

- First grade: fish in one piece (no missing body parts), chewy meat, fresh smell, bright red and clear fish color.
- In second grade, the fish color is slightly faded, and the fish body has a few defects that can still be tolerated (scales are slightly peeling)
- Below standard, smelly fish, green in color, mushy meat, there are physical defects such as (hollow meat exposed to hooks)

3. Scaling

The combing method scrapes the combing tool on the surface of the fish horizontally from the tail towards the head of the fish evenly until there are no scales left. Scaling is done quickly, cleanly, and carefully, and a cold chain is applied to prevent bacterial growth.

4. Filleting

The fillet process separates the fish meat from the bones by cutting the fish meat horizontally on the left side from the head towards the tail, the right side from the tail towards the head, and the knife sticks to the center thorn. This process is done carefully so the fish skin is not torn and the meat is not damaged. Fillet meat is free from bones, easy to process, and can be stored long-term. Before the fillet process, the equipment must be clean and sanitary, and a waste disposal site must be available.

The resulting fillet meat is arranged in a clean container box. The bottom of the box is given ice flakes as a base. Fillet meat is prepared by arranging the meat to cover the surface of the ice flake. After the meat is arranged, ice flakes are added on top of it, and so on until the container box is full, adding ice flakes to maintain the temperature of the meat so that it is not more than 5 ° C.

5. Bones Removal and Trimming

The bone removal process involves removing the thorns attached to the fillet fish meat using stainless steel clamping scissors. The thorns removed are located on the pectoral part, totaling seven pieces. Thorn removal is done carefully as it can affect the yield and texture of the fish meat.

After the bone removal process, the trimming process is carried out to obtain fillet meat that is neat, uniform, clean from unwanted meat parts, and following the buyer's request. The trimming process removes unsuitable meat and white membranes near the fins and smoothing and shaping the fillets to facilitate the packaging process.

6. Final Checking

The final checking process ensures the meat is free of scales and thorns. It includes checking for scales, thorns, imperfect color appearance, and neatness of

fillet shape. The neat and uniform meat is arranged in a clean container box. The bottom of the box is given ice flakes as a base. Adding ice flakes maintains the meat's temperature so it does not exceed 5°C.

7. Sizing

The sizing process involves weighing and cutting the fillets to classify the size of each fillet based on the size determined by the company. Before the sizing process, a 10 kg digital scale is calibrated and recorded on the monitoring sheet. The knife used for sizing is made of stainless steel. The 60x42x32 fish basket is first cleaned and then given ice flakes to keep the fish temperature no more than 5°C.

8. Weighing II

Weighing II to determine the final weight of the fillet process. The scales used are digital scales with a capacity of 60kg. The function of weighing II is to determine the weight of fillet meat per basket and the results of the calculation of fillet meat yield, which is then recorded on the yield monitoring sheet. This process is carried out quickly, carefully, and cautiously to maintain the temperature of the product so as not to experience an increase in temperature and ensure the accuracy of employees so that there are no errors in weighing.

9. Washing II

Washing II is done to clean the fillet meat from the remnants of scales, thorns, and dirt attached to the fillet meat; the fillet meat is washed using storage water in the washing tub according to drinking water standards. The ratio of ice flakes, washing water, and fillet meat is 3:2:1. In addition, washing II also uses a chlorine solution of 5-10 ppm as a disinfection for the destruction of bacteria through germicidal power and surface bacteria will disappear (Mayangsari & Sipahutar, 2021).

Washing II involves dipping the fillets into the washing tub one by one for 10 seconds to maintain their temperature. The water in the tub is changed every 5 baskets to prevent dirt from sticking back to the fillets. Washing is necessary because residual dirt on the meat, such as scales and mucus, can cause contamination (Mahdiyah, 2018).

10. CO Treatment

CO Treatment aims to obtain cherry red fil-let meat. CO treatment is done by putting the fillet meat in a basket into LDPE plastic that has been coated with a thin sponge to absorb the water that is still in the meat and to provide a cavity when filling CO gas so that the gas is evenly distributed over the entire surface of the fillet meat. Then carbon monoxide gas was sprayed into the plastic as much as 2 bar (2 bar = 29 PSI) and tied tightly. Spraying CO gas to form a cherry red col-or on the fillet

meat, the sprayed CO will react with myoglobin in the meat to form carbox-ymyoglobin. The formation of carboxymyoglo-bin compounds can prevent the oxidation process in fish that can turn it brownish. CO treatment is carried out to follow the requests of buyers from America where the country does not prohibit the use of CO in products (Loppies et al., 2021).

Fillet meat sprayed with CO gas is placed in a basket and stored in the chilling room. Storage of fillet meat in the chilling room aims to maximize the penetration of CO gas with fillet meat to form carboxy myoglobin so that the color of cherry red fillet meat is evenly distributed. The function of storage in the chilling room is to keep the center temperature of the meat cold and prevent microbial growth. Storage in the chilling room is done for 6-7 hours with a temperature of 1°C-3°C to get maximum results.

11. Packaging and vacuum

Fillet products are packaged manually by inserting the fillet meat one by one into vacuum plastic with the size according to the fillet meat. Vacuum plastic is a product protector that does not come into direct contact with the master carton and prevents product dehydration during freezing. The vacuum process is carried out for 30 seconds with a pressure of 1 atm to remove air in the packaging to produce a product that looks compact, can prevent oxidation, protect the product against external contamination, and can provide a longer shelf life because it airtight and able to maintain color changes during frozen storage.

12. Drafting on the long pan (layering)

The longpan's drafting process maintains the shape of the fillet product. It also serves as a container in the freezing process to ensure a perfect product. Each longpan is given a supplier code, fish type, size, and production date. The filled long pan is then arranged on the ABF iron rack to facilitate transportation from the fillet room to the ABF machine.

13. Freezing

Freezing is the process of reducing the temperature to below freezing point, and the water contained in the meat turns into ice. The equipment used is quick freezing or Air Blast Freezer (ABF). The temperature on the ABF machine is maintained and monitored to prevent temperature fluctuations. The shelves are arranged according to the production date and coding to facilitate the product retrieval. Freezing to reduce the temperature of the product center until it reaches -18 ° C; if the product temperature has not reached -18 ° C, then additional freezing time must be done.

14. Weighing III

Weighing III of red snapper fillet products to obtain product weight per master carton. During the weighing process, QC takes one product sample per shelf at random to check the temperature by making a small hole in the product using a special stainless stick and hammer. Then, the product temperature is measured using a thermometer inserted into the small hole and recorded on the product temperature monitoring sheet.

15. Metal Detector Check

Metal Detection to ensure that products are free from metal flakes that can harm humans if they consume them. Products weighed per basket are then checked for metal by passing the product through a metal detector machine. Before performing a metal inspection on the product, the metal detector must be verified using a test piece (stainless 3.0 mm, non-Fe 2.5 mm, Fe 2.0 mm).

If the machine detects the presence of metal or harmful foreign objects, it will issue an alarm sound. If a product is indicated to contain metal, it will be passed back three times in a row with a changed position. If the metal detector still sounds, QC and metal detector officers will separate and recheck the product to ensure its safety. Metal-detected products will be handled and reported in the QC record. Metal detector machines are checked and calibrated every two hours.

16. Packaging and Labeling

Red snapper fillets are packaged in two packages, namely PE (polyethylene) plastic and master carton. Products that have passed the metal detection process are packaged using PE plastic measuring 63/40 x 003 x 40 to facilitate the packaging process according to the shape of the packaged fillets. Products that have been packaged in PE plastic are then packaged using a crimson double-wall master carton, which functions to withstand external pressure so that the product remains protected. In one carton, 4.54 kg of natural CO red snapper fillets match the type, size and production code.

On the master carton, there is a product label with information about the product that has been determined by the company and by BPOM Regulation No. 31/2018 concerning Processed Food Labels, where the product label contains the product name, ingredients used, net weight, name and address of the producing company, production date and code, expiration information, destination country of export, how to use the product, and how to store.

17. Storage

Storage is needed to extend the shelf life and maintain the product's center temperature at 18°C. Fillet products arranged on pallets are moved into cold storage using a forklift. The arrangement in cold storage uses the FIFO (First In, First Out)

system; the FIFO system is the item that enters first will come out first so that no product is stored for too long in cold storage. The cold storage temperature is also maintained and monitored to keep it stable so there are no temperature fluctuations. Temperature fluctuations can be caused by thermostats that do not work correctly or cold storage doors often opened and closed, causing heat from outside the room to move into cold storage.

18. Stuffing

At this stage, the master carton is transported from cold storage three to the container using a forklift. The company has determined the temperature in the container, namely -25 ° C. If the container temperature has not reached -25 ° C, stuffing cannot be done. Some things that need to be considered before stuffing include sanitation (container, product), temperature, equipment (seal), and the suitability of the road letter with the seal. There are two sizes of containers used by PT Alam Jaya according to the buyer's request, namely 20-foot containers and 40-foot containers.

Temperature Observation

Cold chain observations were made at the CO natural red snapper fillet process stages, from receiving raw materials to product storage. In addition to the temperature of the product, the temperature of the washing water and the temperature of the processing room were also observed.

1. Product Temperature

Temperature measurements on the product are carried out by receiving raw materials, filleting, trimming, and weighing III. Measuring fish temperature determines its temperature and ensures its good condition according to SNI 2729: 2013 Fresh Fish. The average results of product temperature observations can be seen in Table 2.

Table 2. Average Product Temperature

Process Stage	Average Product Temperature (°C)*	Company Standard Max (°C)
Receiving Raw Material	1,17	5
Filleting	2,37	5
Trimming	2,29	5
Weighing III	-25,73	-18

Source: Processed Data (2023)

Notes: Average based on twenty observations

At the stage of receiving raw materials, the average temperature obtained was 1.17°C; this has met the standard by maintaining a temperature of no more than 5°C because during the distribution of raw materials using a pickup with a tarpaulin

cover and raw materials arranged in a cooler box that has been given ice. Temperature changes began to increase at the filleting stage; the average temperature obtained was 2.37°C. This occurred due to the use of ice that was lacking during the processing process the handling time was too long and the difference in room temperature from the process room to the fillet room, to prevent the temperature from exceeding the maximum limit must be given the addition of ice evenly.

The temperature decreased at the trimming stage with an average temperature of 2.29°C; this occurred because ice was added to the meat, and the handling process did not require a long time and a cooler room temperature to prevent the temperature from rising too quickly. At the packing stage, there is a very significant decrease in temperature because the product has passed the freezing process on the ABF machine in the packing process. From the observation the average temperature for products at the packing stage is -25.73°C while for SNI standards, it is -18°C. This is not a problem because the company has implemented a standard for product temperature not less than -18°C.

2. Washing Water Temperature

Observation of washing water temperature to determine the effect of water temperature on product temperature. Water temperature that is higher than the product temperature can cause the temperature of the natural CO red snapper fillet product to rise. The average results of the washing water temperature observation can be seen in Table 3.

Table 3. Average Washing Water Temperature

Process Stage	Average Washing Water Temperature (°C)*	Company Standard Max (°C)
Washing I	2,90	5
Washing II	2,21	5

Source: Processed Data (2023)

Notes: Average based on twenty observations

The water temperature of washing II is lower than that of washing I. This is because the amount of ice used in washing II is more than in washing I. The room temperature is different between washing room I and washing room II, and the temperature of washing room II is better for preventing the temperature from rising too quickly.

3. Room Temperature

The temperature in each processing room can affect the fish's temperature. The higher the room temperature, the easier it is for the fish to absorb heat from the room, so much ice is needed to keep the fish's temperature below 5°C. Table 4 shows the average results of the washing water temperature observations.

Table 4. Average Room Temperature

Room	Average Room Temperature (°C)*	Company Standard Max (°C)
R. Penerimaan Bahan Baku	29,95	25 - 35
R. Proses	24,95	20 – 30
R. *Fillet*	19,25	15 – 20
Chillingroom	2,43	0 – 5
R. *Packing*	9,8	5 – 15
Anteroom	10,45	0 – 15
ABF 2	-36,27	-35 – (-40)
Cold Storage 2	-21,93	-10 – (-25)
Cold Storage 3	-19,92	-15 – (-22)

Source: Processed Data (2023)

Notes: Average based on twenty observations

According to Table 4, the average temperature of the raw material reception room to cold storage still meets the company standard of no more than 35°C. Based on the average room temperature table above, the raw material reception room, process room, and fillet room have met the standards set by the company, namely <35 ° C. While for the packing room, chilling room, ante-room, ABF 2, cold storage 2, and cold storage 3. As for the packing room, chilling room, anteroom, ABF 2, cold storage 2, and cold storage 3, the temperature is lower because there are blowers to optimize the temperature and ensure air circulation.

Yield Calculation

The yield calculation is carried out at two stages of the process: the receiving raw materials and the weighing stage II. The yield obtained is by the company standard of 42-44%. There are differences in yields because the skills of each employee vary but do not exceed the standards set by the company. The average yield calculation results can be seen in Table 5.

Table 5. Average Yield Calculation

Process Stage	Average*
Receiving Raw Material (Initial Weight)	115,50 kg
Weighing II (Final Weight)	49,93 kg
Yield	43,23 %
The yield standard set by the company is 42-44%	

Source: Processed Data (2023)

Notes: Average based on twenty observations

The table above shows the average results of the initial weight of whole raw materials, the final weight of meat at the weighing stage II, and the yield results obtained. The average initial weight obtained in receiving raw materials is 115.50 kg. Then the raw material goes through the process of Pendidikan, removal of entrails, pemfilletan, removal of thorns, trimming, and finally sizing and gets a final weight of 49.93 kg in the weighing process II.

Implementation of Processing Unit Basic Eligibility Requirements

The implementation of basic feasibility at PT Alam Jaya includes the physical requirements of the processing unit, the implementation of GMP, the implementation of SSOP, and the implementation of the basic feasibility of the processing unit.

1. Physical Condition of UPI

The physical requirements of the processing unit must be considered, especially the location and building of the processing unit. Physical requirements at PT Alam Jaya include the following aspects:

Table 6. Appropriateness of Basic Feasibility Aspects of Location and Environment

Basic Feasibility Aspects	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
Location and environment	The location around the UPI area is adequate for doing work in sanitary and hygienic conditions. It is not a source of contaminants and is maintained/guarded to prevent insects, rodents, and other nuisance animals.	The area around UPI is large enough for work to be done freely. The UPI location is 5.2 km from residential areas. On November 27, 2023, the air quality was 72 US AQI with the central pollutant PM 2.5 and PDAM water that had gone through two filter processes. The yard and road around the factory or processing unit are always kept clean.

Source: Processed Data (2023)

2. Building

The factory building at PT Alam Jaya is designed and organized according to the sequence of activities carried out so as not to cause confusing traffic, thus clearly separating each space.

Table 7. Appropriateness of Basic Building Eligibility Aspects

Basic Feasibility Aspects	**Standard (PERMEN KP Nomor 17 Tahun 2019)**	**Observation Results**
Entrance	It is made of smooth material, watertight, and easy to clean and disinfect. It is designed to open outward or sideways, can be appropriately closed, and is permanently closed. It is equipped with insect-prevention devices and plastic curtains.	The entrance door is made of aluminum, has a smooth surface, is free of rust, is flat, is watertight, is easy to clean, can close automatically, and is coated with plastic curtains. At each entrance, there is an insect killer to eliminate insects.
Floor	The floor surface is smooth and without cracks, easy to clean and disinfect, made of impermeable materials, resistant to salt, acids, bases, and other chemicals, not easily broken, and constructed to prevent stagnant water.	The floor is made of green sica. The floor for the raw material receiving room, process room, fillet room, packing room, and anteroom has a sufficient slope of ±3° toward the drain located on the right side of the room.
Wall	The wall surface is waterproof, not easy to peel off, smooth, flat, without cracks, non-toxic, and easy to clean and disinfect; the meeting between the floor and the wall and the wall is easy to clean.	The walls are 3 meters high and made of white glossy panels. They are smooth, flat, non-rusting, and watertight. The corners between the walls, the ceiling, and the floor are concave and easy to clean.
Roof	Designed to prevent dirt accumulation, condensation, mold growth, and peeling, free of cracks and gaps, smooth surface, easy to clean, light-colored	The processing room's ceiling is made of panel material. Its flat, light-colored, shiny surface is not easy to peel, leak, or rust.
Ventilation	Ventilation is sufficient for air circulation, prevents condensation, and can prevent the entry of	The use of ventilation at PT Alam Jaya was replaced by using a blower. A blower is always turned on for air

Basic Feasibility Aspects	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
	contaminants into the process space; air flows well from clean areas to dirty areas, easy to maintain and clean	circulation in the production room so as not to evaporate, remove unwanted odors, avoid temperature increases in excessive heat.
Lighting	Lighting is adequate and process room lights are equipped with safe guards.	The processing room at PT Alam Jaya is well lit using white lights and is bright enough with fiberglass coating.
Sewerage	Sewers are constructed to prevent contamination and flow from clean to dirty areas. They are adequate and clean to drain sewage (liquid waste).	The drain, which is elongated and located at the edge of the production room, leads to the waste disposal door, and there is a cover filter.

Source: Processed Data (2023)

Operational Requirements

1. Implementation of *Good Manufacturing Practices* (GMP)

GMP is the main requirement before a food industry can obtain Hazard Analysis Critical Control Point (HACCP). GMP implementation includes several aspects, the aspects of GMP are as follows:

Table 8. GMP Aspect Conformance

GMP Aspect	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
Raw Material Selection	The source of raw materials comes from unpolluted waters, does not come from prohibited fish species, is free from biological, chemical, and physical hazards, the transportation of raw materials uses qualified transportation equipment.	Quality Control and supervisors select raw materials. Raw materials are caught in the North Sea of Java Island. They are transported using a pick-up car with a tarpaulin cover and a more excellent box as a container.

GMP Aspect	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
Handling and Processing	Use technology in handling and processing, paying attention to time, speed, temperature, the type of product and its designation, and using buildings with facilities according to requirements.	Handling and processing at PT Alam Jaya is good enough by consistently implementing a cold chain. Handling and processing are done quickly and carefully. Handling and processing at PT Alam Jaya uses adequate and hygienic facilities and equipment that have been swabbed.
Helpers and Chemicals	Permitted auxiliary materials and chemicals, by requirements and procedures, do not harm or endanger human health, and come from unpolluted sources	Water and ice are the auxiliary materials used. The chemicals used to help the production process are chlorine, 70% alcohol, and 60% chlorine, used according to procedures.
Packing	Performed in a hygienic place to avoid contamination and packaging materials protect and maintain quality from external influences and do not become a source of contamination.	Packaging uses primary, secondary, and tertiary packaging. Primary packaging is vacuum plastic, secondary packaging is Polyethylene plastic, and tertiary packaging is MC crimson double wall.
Storage	Storage temperature and conditions are maintained, materials and products are stored separately, storage locations are clean and free from animals, materials and products are marked and placed, FIFO system storage.	Frozen raw materials and final products are stored separately in cold storage at temperatures between -10°C and -25°C. Cold storage is cleaned before production, and a ct killer is in this anteroom. The arrangement in cold storage uses the FIFO (First In First Out) system.

Source: Processed Data (2023)

2. Implementation of *Standard Sanitation Operat-ing Procedure* (SSOP)

The SSOP aspect at PT Alam Jaya refers to PERMEN KP Number 17 of 2019 concerning the requirements and procedures for issuing a Certificate of Processing Feasibility. The purpose of sanitation and hygiene is to prevent the entry of contaminants into food and processing equipment and to prevent contamination.

Table 9. SSOP Aspect Conformance

SSOP Aspect	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
Water and Ice Safety	Water is odorless, colorless, and tasteless. It comes from a non-hazardous source, pipelines are designed to prevent contamination, ice uses water that meets drinking water requirements, and ice must be stored clean.	PT Alam Jaya uses PDAM water for the production and sanitation process. The company's water use has met the requirements, namely drinking water standards, both for products and santation. The ice used by PT Alam Jaya is ice flake made by itself with a flake ice machine using product water.
Condition of Surfaces in Direct Contact with the Product	Made of rust-proof material, easy to clean and does not cause contamination, equipment and supplies are marked for each area so as not to cause contamination	Equipment used in the production process that is in direct contact with the product ensures that it is rust-proof, easy to clean, and made of impermeable materials. Clean production equipment and supplies are stored in the tool storage room.
Condition of Handwashing, Sanitation and Toilet Facilities	UPI construction and layout designed to prevent contamination from entering, adequate process unit space available	PT Alam Jaya has implemented measures to prevent cross-contamination, such as prohibiting bringing cellphones into the production room, using accessories, smoking, spitting, eating, and drinking in the production room. The company's production room is differentiated for each process.
Condition of Handwashing, Sanitation and Toilet Facilities	Handwashing facilities and toilets are available in sufficient quantity, in good working order, and in clean and sanitary condition.	The sanitation facilities used are handwashing stations, foot washing basins, and toilets. In front of the entrance to the process room, there are handwashing facilities totaling 12 faucets. Inside the process

SSOP Aspect	Standard (PERMEN KP Nomor 17 Tahun 2019)	Observation Results
		room and next to the toilet, there are enough toilets, each totaling 1 sink, and sanitation workers always keep them clean.
Control of Chemicals, Cleaners and Sanitizers	Chemicals, cleaners and disinfectants must be by the requirements, used as directed, clearly labeled, stored in a separate room and there are special personnel appointed and responsible.	Food and non-food materials are stored in separate and safe places. Chemical, cleaning, and sanitizer storage is in a separate room, labeled according to type.
Labeling, Storage, Use of Toxin Materials	Hazardous chemicals are clearly labeled and stored separately, using the required methods and procedures.	Toxin materials are stored in a room that is separate from other rooms and has limited access, The toxin material storage room is cleaned daily by sanitation workers.
Employee Health Condition	Employees who are in direct contact with the product are not sick, and their health conditions are monitored periodically. Eating and drinking are prohibited in the process room, employees must wear complete PPE, the changing room used by employees is available in sufficient quantities, and lockers are used to store employees' belongings.	Employee health checks are carried out at least once a year with a medical health check by a doctor or health center medical officer. Employees must use full APD before entering the process room, and they must maintain cleanliness while working.
Pest Control	Insect, rat and other pest control facilities are available, and control procedures are in place and carried out regularly	The pest control tool used was a plastic curtain. Insect killers were installed in 6 areas, rat boxes in 19 areas, and rat traps in 5 areas.

CONCLUSSION

The process flow of natural CO red snapper fillet processing at PT Alam Jaya includes: receipt of raw materials, sorting, stocking, washing I, filleting, deboning & trimming, final checking, sizing, weighing II, washing II, CO treatment, packaging and vacuum, preparation on longpan, freezing, weighing III, metal detection, packaging & labeling, storage, and stuffing, with the addition of the deboning process carried out after the fillet process and CO treatment carried out after the washing II process. The implementation of the cold chain at PT Alam Jaya is well done, the average product temperature is -19.9°C, the washing water is 2.5°C and the production room temperature is 30°C. Moreover, the average result of calculating the initial weight yield in receiving raw materials is 115.50 kg and the final weight in the weighing process II is 49.93 kg, thus getting an average result of 43.26%.

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