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CRITICAL CONTROL POINTS (CCP) ANALYSIS OF FREEZING PRODUCTION PROCESS OF BREADED *PEELED DEVEINED TAIL ON* (PDTO) SHRIMP PRODUCTS AT PT. XYZ

Analisis *Critical Control Points* (CCP) Proses Produksi Pembekuan Produk Udang *Breaded Peeled Devained Tail On* (PDTO) di Pt. Xyz

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ABSTRACT

Indonesia has great fishery potential, especially vannamei shrimp as an export commodity with high nutritional value that must be processed hygienically. PT. XYZ applies the Hazard Analysis Critical Control Point (HACCP) system to ensure the safety and quality of frozen breaded shrimp products according to international standards. This study used a descriptive method with observation, interviews, active participation, and documentation during the research. The analysis of Critical Control Points (CCP) in the frozen breaded PDTO shrimp production at PT. XYZ is an important step in applying the second principle of HACCP to identify and control critical points to prevent physical, chemical, and biological hazards during production. Using a decision tree, PT. XYZ identified four main CCPs: raw material reception (antibiotic and sulfite content), breading area "buttermix process" (pathogenic bacterial growth), packaging (allergen labeling), and metal detecting. Each CCP has specific critical limits, systematic monitoring procedures, and corrective actions if deviations occur. The goal is to ensure product safety and quality in compliance with SNI standards and export requirements through integration of the initial five steps and seven HACCP principles, along with regular verification and documentation. PT. XYZ has successfully maintained the quality and safety of breaded PDTO shrimp products that meet domestic and international market standards.

Keywords: Vannamei Shrimp, Breaded Shrimp, Food Safety, Critical Control Points.

ABSTRAK

Potensi perikanan Indonesia yang besar, khususnya udang vaname sebagai komoditas ekspor dengan nilai gizi tinggi yang harus diproses secara higienis. PT. XYZ menerapkan sistem *Hazard Analysis Critical Control Point* (HACCP) untuk menjamin keamanan dan mutu produk udang breaded beku sesuai standar internasional. Metode penelitian deskriptif digunakan

dengan observasi, wawancara, partisipasi aktif, dan dokumentasi selama pelaksanaan penelitian. Analisis *Critical Control Points* (CCP) pada proses produksi pembekuan udang *breaded* PDTO di PT. XYZ merupakan langkah penting dalam penerapan prinsip kedua HACCP untuk mengidentifikasi dan mengendalikan titik kritis untuk mencegah potensi bahaya fisik, kimia, dan biologi selama produksi. Dengan menggunakan pohon keputusan, PT. XYZ menetapkan empat CCP utama, yaitu penerimaan bahan baku (kandungan antibiotik dan sulfit), area *breaded* "proses *buttermix*" (pertumbuhan bakteri patogen), pengemasan (pelabelan *allergen*), dan metal *detecting* (deteksi logam). Kemudian, setiap CCP diberikan batas kritis spesifik dan disertai prosedur pemantauan yang sistematis dan tindakan koreksi jika terjadi penyimpangan. Tujuannya untuk memastikan keamanan dan kualitas produk sesuai standar SNI dan persyaratan ekspor dengan melalui integrasi lima langkah awal dan tujuh prinsip HACCP, serta verifikasi dan dokumentasi yang rutin. PT. XYZ dapat dikatakan berhasil menjaga mutu dan keamanan udang *breaded* PDTO yang memenuhi standar pasar domestik dan internasional.

Kata kunci: Udang Vanamei, Udang Breaded, Keamanan Pangan, Titik Kritis.

INTRODUCTION

Indonesia has enormous fisheries potential as the world's largest archipelagic nation, according to Trenggono (2023), with fish resources in its waters estimated at 9.931 million tons per year. Indonesia's fisheries potential has developed rapidly, from a focus on the local market to becoming the world's third-largest fisheries producer in 2010. In the modern era, fisheries production continues to increase significantly, with the current 2025 production target of 24.58 million tons, with significant contributions from capture fisheries and aquaculture, including the processing of semi-finished or value-added products. Furthermore, this sector plays a crucial role in seafood exports, which contribute to the provision of nutrition for the community and national economic growth. However, challenges such as overfishing and the need for sustainable management remain key concerns for maintaining the sustainability of Indonesia's fisheries resources.

Whiteleg shrimp (*Litopenaeus vannamei*) is a common fishery commodity in Indonesia. Whiteleg shrimp cultivation in Indonesia has grown rapidly, particularly in East Java, Bali, West Java, and South Sulawesi, as a result of improvements in cultivation technology and international market demand. With its high quality and high production volume, Indonesian whiteleg shrimp has become a major source of shrimp exports to various countries, including the United States and other Asian countries. Its popularity has encouraged more efficient and hygienic processing, including frozen products such as peeled and head-on shrimp, or added value products such as breaded peeled, deveined tail-on (PDTO) shrimp. Whiteleg shrimp are also a key ingredient in popular frozen products, as they meet international quality standards and offer high-quality products sought after by the global market as a practical and nutritious processed seafood ingredient (Maflahah *et al.,* 2020).

According to Masengi *et al.,* (2018), Hazard Analysis Critical Control Point (HACCP) is a food safety management system that aims to identify, evaluate, and control hazards that can affect food safety during the production process. The HACCP system focuses on prevention rather than final product inspection, emphasizing the importance of determining critical control points (CCPs) throughout the production chain, from raw material receipt to final product distribution. Implementing HACCP in the food industry, particularly in fishery products, is crucial to ensure that products are free from contamination by microorganisms or other hazardous materials that could harm consumers.

According to Java (2019), Critical Control Points (CCPs) for the shrimp freezing process are critical points in the frozen shrimp processing process, including temperature and

raw material handling during the receiving, cutting, grading, and peeling stages, to ensure shrimp remain at a temperature of ≤ 3°C. Strict shrimp freezing control at this stage aims to maintain freshness, prevent microbial growth, and maintain product quality and safety before further freezing.

RESEARCH METHODS

The research was conducted from July to August 2025. The case study location was a fishery product processing industry, converting farmed whiteleg shrimp into a final product, an added-value product (breaded shrimp), at PT. XYZ. The data collection method used at PT. XYZ was descriptive, utilizing survey techniques and interviews with both external and internal parties. This aimed to systematically describe various facts related to the frozen PDTO breaded shrimp production process. Primary data collection was conducted through direct field observation, interviews with relevant parties, active participation in various production activities, and documentation of observation results to obtain real and accurate data (Syahrizal & Jailani, 2023).

Observation is a data collection method through direct or real-time observation of phenomena without intervention, allowing researchers to factually record behavior or activities in the field (Romdona *et al.,* 2025). Interviews were used as a direct interaction technique to elicit in-depth information from informants in both structured and unstructured ways (Wijoyo, 2022).

Active participation involves researchers' direct involvement in field activities so they can experience and understand the context of the application of theory in practice (Rahma, 2019). Meanwhile, documentation involves collecting and storing data in the form of images or notes that serve as evidence or sources of information in the research (Sudarsono, 2017). This method ensures accurate, valid data that can adequately describe the actual conditions at PT. XYZ for the analysis and evaluation of the HACCP implementation system and the analysis of determining CCPs in PDTO breaded shrimp production.

RESULT AND DISCUSSION

Process Flow

The production process flow for frozen PDTO breaded shrimp at PT.XYZ consists of 19 process stages with an explanation in Figure 1 below.

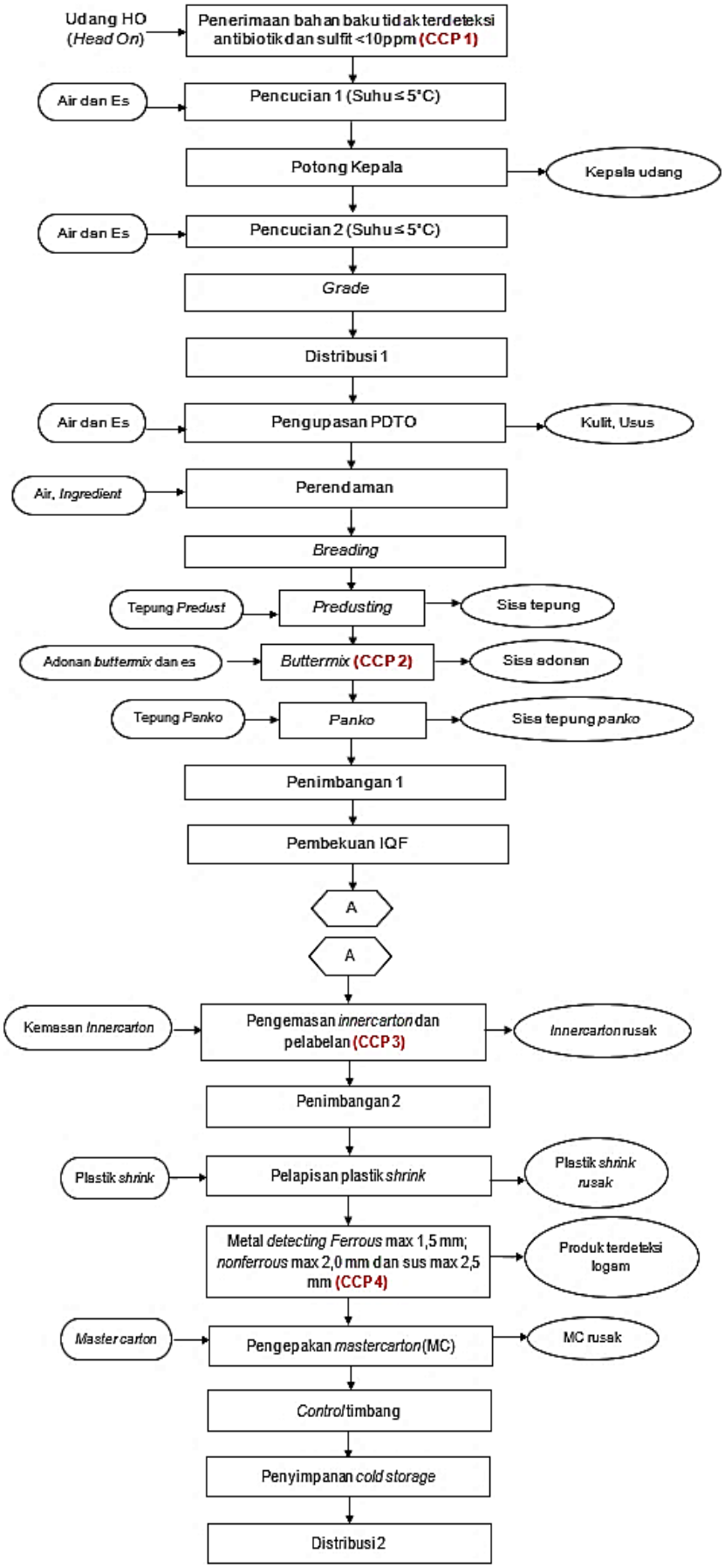

Figure 1. Flowchart of PDTO Breaded Shrimp Production Process

Receipt of Raw Materials

Receipt of fresh vannamei shrimp raw materials at PT. XYZ is carried out every weekday morning by maintaining a temperature of ≤ 5˚C to maintain the cold chain and prevent quality degradation during the unloading process. Before receiving raw materials, fresh shrimp must undergo laboratory tests which include antibiotic content, sulfite content, temperature, and organoleptic tests according to SNI 01-2728.1-2006 standards, antibiotic and sulfite content tests using the elisa method and test results will be out within 6 hours, if the raw material does not meet the standard then the raw material is returned to the supplier. This raw material acceptance process is the 1st CCP critical control point at PT. XYZ and includes organoleptic, microbial (ALT, Escherichia coli, Salmonella, Vibrio cholerae) tests, chemical content types of antibiotic content tests, namely (nitrofuran, tetracycline, chloramphenicol) and flith to detect foreign objects. The purpose of this testing is to ensure the quality, safety, and cleanliness of raw materials so that they are suitable for consumption and to prevent contamination and health hazards (Putraisya & Triastuti, 2022).

Washing 1

After unloading, fresh HO (head-on) shrimp are washed using a wash tank machine with water at a temperature of ≤ 5°C and 100 ppm chlorine infusion is added to clean dirt and reduce bacterial growth, according to Putraisya & Triastuti (2022) with the addition of chlorine during washing aims to help kill bacteria, fungi, viruses, and parasites attached to HO shrimp. Then this washing process is followed by draining for 10 minutes to remove residual water and maintain the temperature of HO shrimp at a temperature of ≤ 5-8°C so that the quality is maintained optimally.

Cut off the head (PK)

After one wash and size check, HO shrimp are distributed to the inner receiving room for weighing process using a multi weigher machine accurately and efficiently. Next, HO shrimp are stored in a 4 kg capacity stainless steel container with additional ice to maintain the optimal temperature of HO shrimp, which is ≤ 5-8°C. Next, the head cutting process is carried out manually quickly to remove dirt on the shrimp head, according to Handoko *et al.,* (2024) head cutting aims to inhibit the growth of bacteria that cause decay and quality decline in shrimp. In the process of cutting the head of genjer shrimp cannot be removed because it is to maintain the weight of HL (headless) shrimp is not affected.

Washing 2

The second washing is carried out after the head-cutting process to remove any remaining dirt and waste attached to the HL (headless) shrimp. The shrimp are placed in a tank filled with clean, cold water with the addition of ice every 5 minutes to maintain the temperature ≤ 5°C. According to Putraisya & Triastuti (2022), this second washing is to ensure that the HL (headless) shrimp are free from head waste, swimming legs, and genjer skin so that cleanliness is maintained after the head-cutting process.

Grade

The grading process at PT. XYZ is the stage after the second washing of HL (headless) shrimp with units of lbs (454 grams) to automatically adjust the number of pcs and size according to buyer requests. After the grading process with a grading machine, HL shrimp are sorted manually based on size and quality checks by personnel, but the sorting process is not carried out if the quality is not appropriate because it is to streamline the production process time. Shrimp that have been completed the grading process will be collected in baskets, weighed, and checked by QC to ensure the size and quality of the shrimp meet company

standards, according to Putraisya & Triastuti (2022), the grading process aims to group shrimp based on weight and size so that the product is uniform and meets the desired quality standards.

Peeling

The shrimp peeling process at PT. XYZ is carried out cleanly, quickly, and precisely, according to Putraisya & Triastuti (2022) peeling includes the process of removing shrimp skin after sorting and peeling to produce a clean product ready for further processing. One of them is peeling PDTO (Peeled Devained Tail On) shrimp processed from HL shrimp by peeling the shrimp skin from segment 1 to segment 5 and leaving segment 6 and the tail, then the intestines are removed by splitting the back according to the depth requested by the buyer's specifications, such as a depth of 50% or ¾ of the diameter of HL shrimp. For the handling of genjer can be adjusted according to the buyer's request, and for green genjer must be trimmed and dirty genjer cleaned.

Immersion

The soaking process aims to improve the size of the shrimp after shrinkage and add a distinctive flavor to headless shrimp (HL). QC checks the size per lbs and the quality of the shrimp to ensure uniform peeling results. Before soaking, a mother liquor is made with additional salt and sugar according to the buyer's request, then the solution is poured into a bag containing shrimp. The shrimp that has been given the solution is stirred using a stirring machine to speed up absorption and the soaking time is adjusted to the buyer's request. According to Putraisya & Triastuti (2022), soaking is the process of soaking shrimp in a solution of salt, phosphate, water, and other ingredients for about 12 hours to improve the texture and weight of the product.

Breaded

Breading according to Farida & Khairunnisa (2024), is the process of coating food with a mixture of flour (batter) and dry breadcrumbs before frying or baking, which aims to produce a crispy and attractive outer layer and improve texture and maintain the moisture of the raw materials in the coating, and can extend the shelf life of the product. The ratio of PDTO breaded shrimp and flour in the breading process at PT. XYZ is 50%:50% according to the buyer's request. The breading process at this company consists of several main stages, namely predusting, buttermix, and panko.

- **Predusting**

Before the predusting process, the soaked PDTO shrimp are sampled using a 2 kg basket for size checking by analysis personnel who function to ensure the results of the breaded shrimp are uniform according to the buyer's request. After checking, the shrimp are drained for 3 minutes to remove excess liquid so that during the predust, buttermix, and panko coating process they are not too wet. The predusting process is the initial coating with a thin layer of flour or powder on the surface of the PDTO shrimp, according to the SNI 6163:2017 standard which regulates the mixing of wheat flour, starch, protein, vegetable gum, and spices as functional components. The predust flour mixture can be prepared with flour components that have been adjusted to the buyer's request and distributed to the conveyor to coat the PDTO shrimp. The purpose of the predusting process is to bind the raw materials so that the battering process is more even, sticky, and the panko flour can adhere well to the surface of the shrimp meat.

- **Buttermix**

The battermix process at PT. XYZ is the second coating after predusting, which is evenly dipping the shrimp coated with predust flour into the battermix mixture, which is stored

in a stainless steel container with an ice base to maintain the temperature according to company standards. The purpose of the battermix is as an adhesive between the shrimp and panko flour and to add flavor and texture to breaded shrimp products, according to Farida and Khairunnisa (2024) battermix consists of flour, eggs, and water to produce a crispy texture and attractive appearance. This process is also the implementation of the 2nd CCP at PT. XYZ with temperature control, time, and microbial monitoring, especially the potential for Staphylococcus aureus toxins according to SNI 6163: 2017 standards for frozen breaded shrimp products. PT. XYZ regulates the temperature of making and storing the battermix mixture with an optimal temperature of ± 10˚C for 12 cumulative hours and no more or less than a temperature of ≥ 21.1˚C for more than 3 cumulative hours with the aim of being safe for consumption and not causing poisoning. Battermix dough consists of a mixture of flour, starch, gum, water that has a neutral pH (pH 7 according to drinking water standards), and ice according to SNI 487:2015 regarding the use of ice in processing fishery products to obtain optimal viscosity.

- **Panko**

According to Farida and Khairunnisa (2024), the panko process is the process of coating the surface of food, including shrimp, with dry, unprocessed breadcrumbs to provide a crispy texture and crunchy taste and protect the product from moisture loss during cooking. At PT. XYZ, panko is the final coating stage for breaded shrimp, where panko flour is evenly applied to shrimp that have gone through the predust and battermix dipping process with slight pressure to ensure perfect adhesion. All layers of predust, battermix, and panko must be evenly covered according to the SNI 6163:2017 standard, which requires dry breadcrumbs to be free from rancid odors, mold, and foreign matter. The panko process, along with the predust and battermix stages, must be carried out quickly and optimally to maintain the quality of breaded shrimp.

Weighing 1

Weighing 1 is the weighing process of breaded shrimp after going through the predust, battermix, and panko coating stages, where the shrimp are distributed through a final conveyor for product quality and weight checking. The purpose of weighing is to ensure the product weight meets the buyer's specifications and produces a product with a consistent and uniform weight (Putraisya & Triastuti 2022). After weighing, the PDTO breaded shrimp are placed on a longpan for the IQF freezing process. Before freezing, QC performs a re-sampling check to ensure uniform product quality.

IQF freezing

IQF freezing of breaded shrimp is a rapid freezing process that separates the shrimp individually to prevent them from sticking together and accelerates the freezing process (Fito and Mubarok, 2024). At PT. XYZ, breaded shrimp are arranged parallel to each other on blue PE plastic with a white paper tray lining, then fed onto a conveyor to the IQF freezing tunnel for 40–50 minutes at a temperature of -40 to -50°C, but this can be adjusted according to the type, peeling type, and size of the shrimp. The product core temperature must be maintained at ≤ -18°C according to SNI 6163:2017 standards to maintain quality during distribution. This IQF method is widely used in the food industry because it is time-efficient and maintains product quality. After freezing, the shrimp are then packaged and labeled in a packing area with a core temperature of ≤ -18°C to ensure the product remains frozen until it reaches the consumer.

Innercatron Packaging and Labeling

Breaded shrimp products after the IQF freezing process are packaged using an inner carton as the primary packaging which aims to protect the product directly (Putraisya & Triastuti, 2022). Before packaging, allergen information labels are checked to ensure completeness and conformity to buyer specifications. The inner carton label can provide important information such as product name, ingredients, nutritional content, allergen information, serving method, expiration date, and product barcode. The implementation of this allergen labeling is included in CCP 3 at PT. XYZ because allergens, according to James *et al.,* (2024), are substances that trigger an overreaction of the immune system that can harm health, which will decrease, such as nausea, vomiting, and even death in humans if the human immune system is unstable. Therefore, the inclusion of allergen information on the inner carton is very important to help consumers choose safe products that suit their needs. An example of an allergen information label on the inner carton for breaded shrimp products is "Crustacean Shellfish (Shrimp) and Wheat."

Weighing 2

After packaging the product into the inner carton, a second weighing is performed before the inner carton is lined and wrapped in shrink wrap. This second weighing ensures that there is no change in product weight due to fluid loss or ice formation during the freezing process, ensuring that the product weight remains consistent with the net weight stated on the inner carton label (Putraisya & Triastuti, 2022).

Shrink Plastic Coating

After the product in the inner carton is weighed, the next step is to coat the inner carton with shrink plastic using a shrink plastic heating machine (tunnel shrink). Following the heating and gluing process, personnel perform a manual inspection to ensure the shrink plastic is properly installed. The shrink plastic coating aims to provide tight protection to the inner carton to prevent dust or air contamination that can reduce product quality (Putraisya & Triastuti, 2022) and protect the inner carton from physical damage such as scratches that can damage the label information.

Metal Detecting

Metal detecting is a process where a product passes through a metal detector to detect the presence of metal elements or foreign objects that can affect product quality and safety (Putraisya & Triastuti, 2022). This process is carried out after the product is packaged in an inner carton and coated with shrink plastic. The metal detecting stage is included in the 4th CCP area in the breaded shrimp packaging process at PT. XYZ. This tool can detect metal based on diameter sensitivity, namely ferrous metals with a maximum of 1.5 mm, non-ferrous metals with a maximum of 2.0 mm, and stainless steel (SUS) with a maximum of 2.5 mm. This provision ensures that products contaminated with even the smallest metals can be found and separated from the final product.

Weigh Control

Products packaged in master cartons are weighed before being placed in cold storage to ensure each master carton meets the standard weight set by the buyer. This also aims to prevent product quantity discrepancies, whether due to under- or over-packaging of the packaging or master carton.

Cold Storage

The storage process in PT. XYZ's cold storage is carried out by grouping similar products with each other on the same shelf to facilitate the management of CS (cold storage) storage temperatures between -18°C to -20°C which aims to maintain product quality safely (Putraisya & Triastuti, 2022). At PT. XYZ, the product storage system uses the FIFO (First In First Out) system. In addition, the master carton (MC) that enters the cold storage is given a barcode that is affixed after ordering to the admin section, then the barcode contains the material type code, cold storage location code, material number, weight, date, sales order (SO) code, and B text code to record the barcode date to ensure product data and storage date on the MC are accurate.

Distribution

Distribution is the process of sending products from cold storage to buyers while maintaining the safety and quality of breaded shrimp products during shipping. Products are shipped using temperature-controlled container trucks, maintained at -18°C during shipping, and pre-cooled containers to -25°C before loading. The distribution system applies a FIFO system based on the SO number, item name, buyer, production code, number, and quantity of items. The master carton arrangement in the container does not use wooden pallets because the floor already has air circulation. The arrangement also pays attention to the stack height limit to ensure optimal air circulation and prevent damage due to falling master cartons and keep the inner carton contents neat.

Critical Control Points (CCP) Analysis of the Frozen Breaded PDTO Shrimp Production Process at PT. XYZ

Critical Control Points (CCP) analysis is the second principle of HACCP, namely "Identifying Critical Control Points (CCPs). This stage is a control step taken to prevent potential hazards that may occur during the production process. Determining CCPs is also used to reduce potential hazards to acceptable levels and can be done by creating a decision tree.

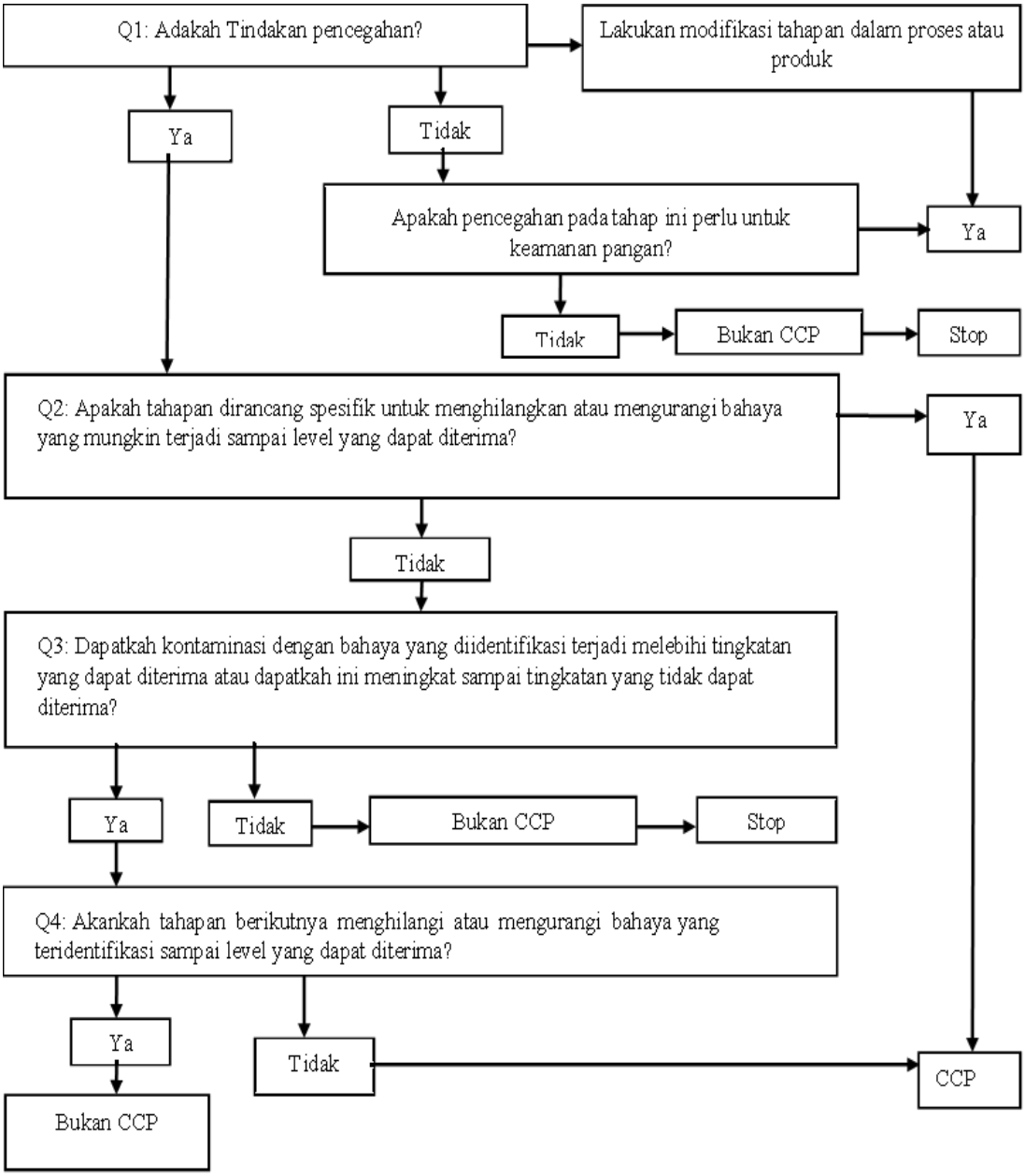

Figure 2. CCP Decision Tree for PDTO Breaded Shrimp Production Process

Creating a decision tree can help identify critical points at a stage of the production process. The breaded shrimp production process at PT. XYZ defines four CCP areas, including:

1. The first CCP in the raw material receiving area with the potential hazard of antibiotic and sulfite content.
2. The second CCP in the breaded area with the potential danger of growth and formation of toxins from pathogenic bacteria is in the process of making and storing buttermix dough.
3. The third CCP of the packaging area with potential hazards is the completeness of information on allergen information labeling.
4. The fourth CCP in the packaging area at the metal detecting stage with the potential danger of metal in the product.

The determination of the CCP that has been made can be obtained from the decision tree in the image above and each stage of the process is explained in Table 1.

Table 1. CCP in PDTO Breaded Shrimp Production Process

Tahapan proses	Acuan	Potensi Bahaya	Hasil Pohon Keputusan				
			Q1	Q2	Q3	Q4	CCP
Penerimaan bahan baku	Acuan: SNI 01-2728.1-2006	Antibiotik (kimia): - *Chloramphenicol* (CAP) - *Nitrofurans* (AOS&AMOZ) -*Fluroquinolone* (*Sarafloxacin,Ciprofloxacin,Enrofloxacin,Difloxacin*) - *Tetracycline* (CTC & OTC) Sulfit (kimia)	Y	T	Y	T	CCP
Breaded	Acuan: SNI 6163:2017	Adanya pertumbuhan dan pembentukan racun dari *Staphylococcus aureus* (biologi)	Y	Y	-	-	CCP
Pelabelan *(allergen)*	Acuan: SNI 6163:2017	Pelabelan *allergen* tidak dicantumkan (kimia)	Y	Y	-	-	CCP
Metal detector	Acuan: SNI 6163:2017	Adanya logam (fisika)	Y	Y	-	-	CCP

In the application of HACCP (Hazard Analysis Critical Control Points) and CCP (Critical Control Points) analysis, PT. XYZ applies a structured standard control system to prevent potential material contamination by identifying critical points during the production process, namely in Breaded PDTO (Peeled Devained Tail On) Shrimp products, the application of HACCP is carried out by direct observation of each stage of the process and involves 5 initial steps and the application of 7 HACCP principles to ensure product safety and quality as follows:

- The five initial steps in implementing HACCP include establishing a HACCP team, product description, product identification, use identification, flowchart development, and flowchart verification. These five initial steps include the initial stage of determining and establishing critical control points (CCPs) in each production process.
- The implementation of the seven HACCP principles begins with a hazard analysis in the breaded shrimp production process at PT XYZ. Then, the identification and control of physical, chemical, and biological hazards from raw material receipt to distribution, including potential foreign objects, antibiotic and sulfite residues, and pathogenic microbes such as Staphylococcus aureus and Escherichia coli are controlled through laboratory testing, sanitation, temperature monitoring, and the implementation of SOPs in accordance with SNI. Furthermore, the identification of four main critical control points (CCPs) is carried out using a decision tree and systematic monitoring is carried out involving measurements, frequencies, and responsible parties to ensure that critical limits are not exceeded. Then, a periodic verification process is also carried out by the QA manager and related departments to ensure the HACCP system is running effectively through equipment calibration and record review, as well as complete recording and documentation are carried out for daily monitoring and evaluation that serves to maintain the safety and quality of PDTO breaded shrimp products in accordance with domestic and export market regulations.

CONCLUSION

PT. XYZ has successfully implemented the HACCP system effectively in the PDTO breaded shrimp production process to identify and control physical, chemical, and biological hazards by establishing four main critical control points (CCPs) using a decision tree. The four main CCPs are in the raw material receiving process, the breaded area (buttermix), packaging (allergen labeling), and metal detecting with clear critical limits, regular monitoring, and rapid corrective action if deviations occur. Verification is carried out routinely and complete documentation is also carried out to ensure compliance with SNI standards and export requirements, so that the resulting product is safe, high quality, and in accordance with domestic and international market standards.

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REFERENCES

Farida, I., & Khairunnisa, A. (2024). Effect of Batter Mix Variations on Sensory Quality of Breaded Shrimp. *Jurnal Mutu Pangan: Indonesian Journal of Food Quality, 11*(1), 28-35. https://doi.org/10.29244/jmpi.2024.11.1.28

Handoko, Y. P., Siregar, R. R., Melfina, V., & Siregar, A. N. (2024). Kajian Mutu dan Karakteristik Pengolahan Peeled Tail On (PTO) Stretched Udang Vannamei (*Litopenaeus vannamei*). *Buletin Jalanidhitah Sarva Jivitam, 6*(1), 23-34. http://dx.doi.org/10.15578/bjsj.v6i1.13221

James, C. A., Welham, S., & Rose, P. (2024). Evaluation of Food Allergen Information, Labelling and Unintended Food Allergen Presence in Imported Prepacked Foods and Drinks Purchased Online in The UK. *Food Control, 162*, 110462. https://doi.org/10.1016/j.foodcont.2024.110462

Java, E. (2019). Determinationo Of Critical Control Points (CCP) in Frozen Vannamei Shrimp Product (*Litopenaeus vannamei*) in PT. Grahamakmur Citapratama, Sidoarjo. *Journal of Marine and Coastal Science, 8*(2), 85-90. https://doi.org/10.20473/jmcs.v8i2.21154

Maflahah, I., Rahayu, B. S., & Asfan, A. (2020). Analisis Pengendalian Mutu pada Proses Pembekuan Udang Vaname (*Litopenaeus vannamei*). *Agroindustrial Technology Journal, 4*(2), 108-119. http://dx.doi.org/10.21111/atj.v4i2.4932

Putraisya, R. R., & Triastuti, J. (2022). Penentuan dan Penerapan Critical Control Point pada Produksi Ebi Fry (*Value Added Product*) di PT. Jala Sembilan Semarang, Jawa Tengah. *Journal of Marine & Coastal Science, 11*(3), 1-10.https://doi.org/10.20473/jmcs.v11i3.28674

Rahma, I. (2019). Partisipasi Publik dan Keterbukaan Informasi dalam Penyusunan Kebijakan. *Jurnal Hukum Samudra Keadilan, 14*(1), 80-95. https://doi.org/10.33059/jhsk.v14i1.1101

Romdona, S., Junista, S. S., & Gunawan, A. (2025). Teknik Pengumpulan Data: Observasi, Wawancara dan Kuesioner. *JISOSEPOL: Jurnal Ilmu Sosial Ekonomi dan Politik, 3*(1),39-47. http://dx.doi.org/10.61787/taceee75

Sudarsono, B. (2017). Memahami Dokumentasi. *Acarya Pustaka: Jurnal Ilmiah Perpustakaan dan Informasi, 3*(1), 47-65. https://doi.org/10.23887/ap.v3i1.12735

Syahrizal, H., & Jailani, M. S. (2023). Jenis-Jenis Penelitian dalam Penelitian Kuantitatif dan Kualitatif. *QOSIM: Jurnal Pendidikan, Sosial & Humaniora, 1*(1), 13-23. https://doi.org/10.61104/jq.v1i1.49

Trenggono, S. W. (2023). Penangkapan Ikan Terukur Berbasis Kuota untuk Keberlanjutan Sumber Daya Perikanan di Indonesia. *Jurnal Kelautan dan Perikanan Terapan (JKPT), 1*, 1-8. http://dx.doi.org/10.15578/jkpt.v1i0.12057

Wijoyo, H. (2022). Analisis Teknik Wawancara (Pengertian Wawancara, Bentuk-Bentuk Pertanyaan Wawancara) dalam Penelitian Kualitatif Bagi Mahasiswa Teologi dengan Tema Pekabaran Injil Melalui Penerjemahan Alkitab. *Academia. edu*, 1-10.