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Analysis of Shrimp Canning Product Development

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Abstract*—Product development is a process of modifying and introducing innovations to a product in order to increase its added value and competitiveness. Processing shrimp into canned products is one form of fishery product development that has high market value and promising prospects. Shrimp is a fishery commodity with high economic value and is widely demanded in both domestic and international markets. The purpose of this review article is to examine the development of canned shrimp products in Indonesia, covering aspects of raw materials, production processes, packaging, product appearance, and marketing strategies. The method used is a literature observation approach through various published scientific articles related to shrimp canning. Based on the review results, the development of canned shrimp products can enhance the added value and competitiveness of the product in the market.*

Keywords*—Canning, product development, shrimp.*

I. INTRODUCTION

Shrimp is one of the leading commodities in Indonesia's fisheries subsector, making a significant contribution to the country's foreign exchange earnings. According to data from the Ministry of Marine Affairs and Fisheries, this commodity accounts for 40% of the total export value of fishery products (Junianto, et al 2024). This type of shrimp is widely cultivated due to its high productivity, substantial economic value, and its role as raw material for various processed forms, ranging from frozen shrimp, raw peeled shrimp or Peeled Tail On, to canned products (Niam, et al 2023).

The shrimp processing industry continues to grow along with increasing consumer demand for practical and long-lasting products. Various technologies are applied, including Individual Quick Freezing (IQF), peeling and cooking, and canning. In the canning process, shrimp are packed in tightly sealed containers and sterilized at high temperatures to maintain quality and ensure food safety. However, the number of canning industries in Indonesia remains limited, with only around 77 active business units (Junianto, et al 2024). Challenges faced include limited access to fresh raw materials, high energy and investment costs, and a lack of product variety. Additionally, the implementation of quality assurance systems such as Good Manufacturing Practices (GMP), Sanitation Standard Operating Procedures (SSOP), and Hazard Analysis and Critical Control Points (HACCP) needs to be strengthened so that domestic products can compete in global markets (Sirait, et al 2024).

The development of canned shrimp products is a strategic step to increase the added value of fishery products. Innovation can be carried out in various aspects, starting from the development of raw materials with different qualities and types (fancy, standard, flakes), optimization of the production process to become more efficient and hygienic, to the application of modern packaging such as retort pouches that can extend shelf life. In addition, enhancing product appearance and applying marketing strategies based on the 4Ps concept (product, price, place, promotion) are also crucial components in strengthening the competitiveness of the industry (Junianto, et al 2024). Therefore, this paper aims to comprehensively review various aspects of canned shrimp product development, including raw materials, production processes, packaging, product appearance, and marketing strategies as forms of innovation in a competitive fishery processing industry.

II. LITERATURE REVIEW

Product development in the fishery sector involves a systematic process of transforming fresh or raw materials into innovative products with higher added value. According to Kotler & Keller (2016), product development is an effort to improve or create new products through technological and marketing innovation to meet changing consumer demands. In the fishery industry, innovation not only focuses on extending shelf life but also on enhancing sensory qualities, nutritional value, and sustainability (FAO, 2021).

Shrimp canning is one of the most established preservation techniques that provides long shelf life and global trade opportunities (Pascall, 2022). Studies by Kumar, et al (2020) and Sriket, et al (2021) emphasized that the freshness of shrimp, pH level, and protein content significantly affect the success of the canning process and the final product quality. In addition, innovation in packaging—particularly the transition from traditional tinplate to BPA-free and retort pouch materials—has improved both food safety and consumer appeal (Lestido-Cardama, et al 2022).

Marketing aspects also play a key role in the development of canned shrimp products. According to Sairo, et al (2018), the 4Ps marketing mix—product, price, place, and promotion—determines product positioning and competitiveness. Pedro (2025) highlighted that digital marketing through online platforms such as Instagram and YouTube increases consumer engagement and supports brand visibility for seafood products. Therefore, product development must integrate technological innovation, aesthetic packaging, and effective marketing strategies to achieve sustainable growth and market expansion.

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III. Research Methods

The method used in this study was an observation method focusing on various published sources. The approach involved reviewing relevant literature related to the process and technological innovations in shrimp canning products. The literature sources were obtained from reputable academic databases such as Google Scholar, ScienceDirect, and ResearchGate. Each identified publication was then selected, grouped, and analyzed in depth using qualitative descriptive analysis according to specific subtopics, including raw materials, processing methods, and quality control of the final product. The observation was conducted from October 9 to October 22, 2025.

IV. Result and Discussion

Definition of Canned Shrimp Products

Canning is one of the most widely used food preservation methods in the fishery and agricultural processing industries, as it can significantly extend product shelf life without the need for cold storage. In principle, canning is the process of packaging food materials into hermetically sealed containers, followed by high-temperature heat treatment to achieve commercial sterility. Hermetic sealing refers to packaging that is completely impermeable to air, water, and microorganisms, thereby preventing contamination after the sterilization process. The combination of hermetic sealing and heat treatment is intended to inactivate pathogenic microorganisms and enzymes responsible for food spoilage, ensuring that the product remains safe and of high quality during long-term storage (Pascall, 2022).

Raw Material Development

Advancements in fishery product processing technology have driven the diversification of raw materials used in canned products. Currently, canned filling materials are classified into three main types: fancy, standard, and flakes. The fancy type includes large or whole cuts of high-quality raw materials with an attractive appearance, typically intended for the premium market segment. Meanwhile, the standard type features medium-sized cuts with uniform processing to ensure production efficiency. The flakes type consists of small pieces or fragments, which are by-products of the cutting process but are still suitable for consumption. This classification is widely used in the industry to align product quality, appearance, and pricing (Junianto, 2024).

The development of raw materials in the shrimp canning industry is a strategic aspect to ensure the availability, quality, and sustainability of shrimp supplies as a high-value export commodity. The quality of raw materials greatly determines the final outcome of canned products, both in terms of food safety, taste, and shelf life. The shrimp used in canning generally comes from aquaculture and wild catch, which have undergone grading, cleaning, and rapid handling at low temperatures to prevent spoilage caused by enzymatic and microbial activity (Sriket, et al 2021). According to Kumar, et al (2020), the physical and chemical characteristics of fresh shrimp—such as protein content, moisture level, and pH—significantly affect the success of the canning process and the product's stability during storage.

Innovation in raw material development is also directed towards improving sustainability practices. Eco-friendly aquaculture approaches and the utilization of shrimp waste into value-added products (such as chitosan and astaxanthin) offer opportunities for the canning industry to adopt circular economy principles. Shrimp shells and heads, which are usually discarded, can be utilized to produce natural additives, such as the pigment astaxanthin, which has potential use in the formulation of sauces or fillers for canned products (Higuera-Ciapara, et al 2006). Thus, the development of canning raw materials not only focuses on the quality of fresh shrimp, but also on the optimization of the entire raw material to enhance efficiency and economic value.

Development of the Production Process

The development of shrimp canning production aims to increase added value, quality, and product competitiveness through innovations in ingredients, technology, and quality systems. Innovation is carried out by adding local specialty sauces or spices as well as nutritious ingredients such as vegetables and healthy oils to enrich flavor and nutritional value. Several studies have shown that the addition of media such as oil, sauce, or brine solution in the shrimp canning process affects the sensory quality and shelf life of the product.

According to Moini, et al (2008), canned Penaeus indicus shrimp packed in oil had the best taste and texture quality compared to those packed in tomato sauce or brine. However, research by El-Lahamy & Mohamed (2020) indicated that adding tomato sauce in shrimp canning improved the chemical and microbiological quality of the product. Canned shrimp with tomato sauce had lower moisture content, less protein loss, and a more acidic pH compared to shrimp canned with vegetables. Additionally, bacterial counts were lower due to the antimicrobial properties of organic acids and spices present in the sauce.

Thus, using tomato sauce as a filling medium can enhance flavor, stability, and shelf life of canned shrimp products (El-Lahamy & Mohamed 2020). Based on this information, it can be concluded that adding oil or sauce is an effective innovation in shrimp canning production to improve flavor, nutritional value, and product competitiveness.

Packaging Development

The design of packaging for canned shrimp products needs to be carried out with an integrated approach that includes functional, aesthetic, sustainability, and technological innovation aspects to strengthen market competitiveness while ensuring compliance with international food safety standards regulated by the Codex Alimentarius.

Shrimp canning packaging can be developed using tinplate metal cans (tin-coated steel) because they are rust-resistant, airtight, and capable of preserving the flavor and texture of shrimp for a long time. However, modern trends are also shifting towards lighter packaging such as aluminum cans or easy-open cans (EOC), which make it easier for consumers to

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open the product without additional tools. According to Bakhori (2005), the tin coating, which accounts for about 1–1.25% of the can's weight, functions to prevent reactions between the metal and sulfur compounds from shrimp that can cause black stains.

Deshwal & Panjagari (2019) stated that metal packaging, especially tinplate, has high corrosion resistance and can maintain the quality and flavor of fishery products, including canned shrimp. Further packaging development can enhance visual appeal through full graphic printing designs, allowing packaging to include different images or colors for each flavor, thus increasing aesthetic value and consumer attraction.

Additionally, replacing BPA-containing can linings with BPA-free (epoxy-free) materials can help reduce consumer concerns about food safety and lower the risk of regulatory violations, while making the product appear safer and more trustworthy in the market. The transition to BPA-free (epoxy-free) coatings on cans is important to guarantee food safety and comply with export regulations. Epoxy-based linings containing bisphenol-A have been proven to release residual monomers into food products, leading to the development of alternatives based on polyester, acrylic, and bioresins that are heat- and acid-resistant, suitable for retort products such as shrimp in sauce or oil (Lestido-Cardama, et al 2022; Zhang, et al 2020; Silva, et al 2020).

Figure 1. Packaging Development

Product Appearance

An in-depth analysis of the appearance of modern canned shrimp products reveals a duality in packaging function, intentionally designed to serve both as a protective tool and as a communication medium for effective marketing.

According to Wang, et al (2025), packaging influences consumers' perceptions, emotions, and purchasing decisions by visually connecting the product with them. Functionally, cans made from tin-plated steel or aluminum are a technical prerequisite for high-temperature thermal sterilization (retort), which is essential to ensure microbiological safety and extend product shelf life without the need for preservatives (Safirin, et al 2023).

However, packaging now serves additional functions beyond passive protection. Pull-tabs and Easy-Open Ends (EOP) are examples of modern features that provide practical developments directly supporting customer convenience (Ropikoh, et al 2024).

Figure 2. Product Appearance

According to Pramesti, et al (2024), packaging labels are very important because they function as a silent salesman with the ability to influence consumer purchasing decisions. For example, Bumble Bee, a well-known American seafood company with canned shrimp products, uses blue-colored packaging. The color element has a psychological function; blue is often used to depict the sea, freshness, and trust (Peropa, et al 2025).

The information presented on the front label is also designed to facilitate consumers' decision-making process quickly and efficiently. Highlighting key information such as shrimp size (e.g., Medium Shrimp) and processing status (e.g., Cooked & Peeled) directly addresses fundamental consumer questions about the contents and convenience level of the product (Rosmati, et al 2023). This action represents a form of transparency that reduces ambiguity and speeds up product evaluation by consumers.

Marketing Strategy Development

Choosing the right market segment is crucial since canned shrimp is not a new product. Marketing efforts begin by addressing consumer needs before evolving into fulfilling their desires. Key target consumers include those seeking high-quality seafood and busy families looking for convenient, ready-to-eat meals. Urban consumers, typically upper-middle-class individuals leading hectic lifestyles, prioritize convenience, time efficiency, and quality when selecting food products (Harmonal, et al 2025).

A fundamental element of the marketing strategy is the marketing mix, consisting of product, price, place, and promotion (Sairo, et al 2018). Product differentiation plays a central role, with canned shrimp distinguished by specific attributes such as size, soaking medium (brine or oil), and processing level (peeled), adding direct value (Azzaharah, et al 2025). Pricing is positioned at a premium level to reflect higher raw material costs while matching the perceived quality (Pedro, 2022). Distribution focuses selectively on modern retail channels, such as supermarkets and hypermarkets, and e-commerce platforms to effectively reach urban consumers (Utami, et al 2025). Promotion strategies avoid conventional media, favoring content marketing on digital platforms like Instagram and YouTube, where quick and easy recipe ideas effectively communicate convenience to the target audience (Pedro, 2025).

V. CONCLUSION

Based on the results of the analysis and discussion that have been described, it can be concluded as follows:

1. Raw material development in canned shrimp products is carried out through diversification of filling types such as fancy, standard, and flakes to suit quality, appearance, and market segments. This innovation not only increases economic value but also broadens consumer segmentation based on product quality and needs.
2. In processing, innovation is implemented by adding media such as oil or tomato sauce, which improve flavor, nutritional content, and shelf life. From a packaging

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perspective, the use of tinplate and aluminum cans with easy-open systems and BPA-free coatings is a strategic step to ensure food safety and ease of use, while also strengthening the visual appeal of the product.

3. Marketing strategy focuses on implementing the marketing mix (4Ps) concept, including product differentiation, premium pricing, distribution through modern retail and e-commerce, and digital promotion via content marketing. This approach targets modern consumers who seek practical, hygienic, and high-quality products.
4. The main advantages of canned shrimp products lie in the combination of technological innovation, food safety, modern packaging, and adaptive marketing strategies. Development opportunities remain wide open through exploring local flavors, utilizing natural value-added ingredients, and enhancing branding in both domestic and export markets.

VI. Limitation and Suggestions

This study is limited to literature-based observations and online analyses from published research, videos, and digital media sources without direct fieldwork or laboratory validation. As such, the findings mainly describe conceptual and technological developments rather than empirical measurements of product quality.

Future research is suggested to include on-site observations in shrimp canning industries to validate production efficiency, product quality, and safety aspects. Further studies could also assess consumer preferences, cost–benefit analysis, and environmental impacts of different packaging innovations. Additionally, incorporating sustainability perspectives—such as waste utilization and eco-friendly packaging—would provide more comprehensive insights into the long-term development of the shrimp canning industry.

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