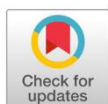


Raw material management for frozen *Parupeneus heptacanthus* fillet products at PT BARUNA, Lamongan, East Java

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Abstract

One of the processing methods for whiskered goatfish (*Parupeneus heptacanthus*) is converting it into frozen fillet products. The raw material management for the production of whiskered goatfish fillet includes receiving the raw materials, washing, filleting, trimming, deboning, and sizing. The aim of this article is to explore the raw material management process in the production of whiskered goatfish fillet at PT Bahari Biru Nusantara. A descriptive method was employed, utilizing both primary and secondary data sources. Data collection was conducted through observation, interviews, active participation, and literature review. Inventory planning and raw material receiving scheduling at PT Bahari Biru Nusantara are crucial to address demand fluctuations and maintain smooth production. Consideration of environmental factors such as seasonality, weather, climate, and resource sustainability also plays a role in inventory management strategies.

Keywords: Whiskered goatfish, frozen fillet, raw material management

Introduction

Marine and fisheries resources are significant potential natural resources with vast economic value. One of the promising fish species in Indonesia, classified as demersal fish, is the whiskered goatfish¹. This fish is favored for its distinctive taste, delicious, savory flavor, and tenderness. Like other seafood products, whiskered goatfish is highly perishable^{2,3}. Since the 2000s, the whiskered goatfish has been widely processed into fillets for export⁴. In addition to processing, proper handling, including freezing is essential to prevent both chemical and microbiological degradation. Effective raw material management is necessary to ensure that the quality of the frozen whiskered goatfish fillets is maintained.

PT Bahari Biru Nusantara is one of Indonesia's leading seafood suppliers, specializing in high-quality seafood products such as natural cut fillets, skinless fillets, steaks, and more⁵. The company produces a variety of products for both domestic and international markets⁶. The production of frozen



whiskered goatfish fillets (*P. heptacanthus*) must be carried out meticulously to guarantee the quality of the resulting product.

Material and methods

Research Time and Location

This study was conducted at PT Bahari Biru Nusantara, located at Jalan Daendels KM 82.6 No. 88, Desa Sedayulawas, Brondong District, Lamongan Regency, East Java Province. The research was carried out from June 19, 2023, to August 19, 2023.

Procedure

The research employed a descriptive method, which involves visiting data sources and systematically analyzing them to ensure accuracy⁷. The process included observation and interviews as key stages of data collection.

Research and Discussion

Raw material acceptance

The acceptance process for whiskered goatfish raw materials requires careful planning and strategic measures to ensure the smooth production of frozen fillets. Key steps in this process include identifying raw material requirements, selecting suppliers, inventory planning, scheduling raw material reception, managing inventory, evaluating quality, considering environmental factors, risk management, and establishing partnerships with suppliers. The identification of raw material needs involves organoleptic, microbiological, chemical, and physical testing to meet the required quality criteria. The organoleptic test references the latest Fresh Fish SNI standard, SNI 2729-2021 (**Figure 1**). The parameters used include the eye, gills, slime, flesh, odour, and texture, with three rating values: 5, 7, and 9⁸. A minimum average score of 7 is required, and any score of 5 results in rejection. Supplier selection takes into account quality, sustainability, price, and strong supplier relationships.

The production process at PT Bahari Biru Nusantara operates daily, except on specific holidays, requiring coordination with suppliers for scheduling purposes. Raw material inventory management encompasses two main functions: inventory planning and control at an optimal level. This involves determining the precise inventory quantity needed to meet production management requirements, in line with the company's schedule and customer orders⁹. Inventory planning involves calculating the initial stock, while scheduling of raw material reception is based on the production schedule to avoid delays. Inventory management utilizes a system to optimize stock levels. Raw material quality evaluation includes organoleptic and microbiological testing, following the Fresh Fish SNI Standard 2013. Pathogenic bacteria such as *Escherichia coli*, *Salmonella* sp., and *Vibrio cholerae* are identified as food safety requirements for fresh fish under the Indonesian National Standard (BSN 2006)¹⁰. Environmental factors, such as season, weather, climate, and other sustainability-related factors, are also taken into account.

Risk management involves identifying potential price fluctuations and supply issues, with contingency plans in place. Supplier partnerships are essential for supply stability and long-term cooperation. Raw material suppliers for PT Bahari Biru Nusantara are sourced from the nearest ports,

goatfish fillets have two variations: skin-on fillets and skinless fillets¹⁵. The goatfish fillets at PT Bahari Biru Nusantara are skin-on fillets. The filleting process is done with a special knife to produce clean fillets free of unwanted bones and skin. The fillets are then placed in perforated baskets on top of ice flakes to maintain freshness. The skill of workers in the filleting area directly influences the quality and yield of the fillets¹⁶.



Figure 2. Washing process

Trimming and bone removal

After the filleting process, the fish fillet undergoes trimming and bone removal. Trimming is the process of refining the filleted fish, removing the belly, red meat, and uneven cuts¹⁷. This process is carried out with a thin knife by skilled workers. The trimmed fillets are then placed on ice to maintain freshness. During the bone removal stage, a stainless steel bone picker is used to remove bones from the center and around the fish's belly (**Figure 4**). The trimming waste and removed bones are processed as by-products, frozen, and marketed. This process ends with a final inspection to ensure no bones are left in the goatfish fillet before sizing.



Figure 3. Filleting process

Sizing

Sizing is the process of grouping fish fillets based on weight standards set by the company or customer requirements¹⁸. The fillets are measured, sorted, and assessed for quality by skilled workers. At PT Bahari Biru Nusantara, goatfish fillets (*P. heptacanthus*) are categorized into two size ranges: 15–40 grams and 40–80 grams (**Table 1**), with strict evaluation to ensure quality standards are met. Additionally, the goatfish fillet grade utilized at PT Bahari Biru Nusantara is Grade A.



Figure 4. Bone removal process

The sizing process also plays a critical role in yield calculation, which is the ratio of fillet weight to the total weight of the fish. The standard yield for goatfish fillets at PT Bahari Biru Nusantara ranges from 44% to 46%. This process not only ensures product quality consistency but also adds value for consumers seeking high-quality products. Four factors influence the yield during processing: fillet meat, head, bones, skin and abdominal parts, and red meat¹⁹. After deboning, the goatfish fillets undergo a secondary washing process. The second washing is performed individually with cold water ($\leq 5^{\circ}\text{C}$) to maintain freshness and remove debris, bones, and trimming residues. This process, in line with Rachmanudin's (2022) perspective, aims to thoroughly clean any potential contaminants on the fillet. Secondary washing is critical for ensuring product cleanliness and safety in the food processing industry²⁰.

Table 1. Size categories of goatfish (*P. heptacanthus*) fillets

| No. | Size (gr) |
|-----|-----------|
| 1. | 15-40 |
| 2. | 40-80 |

Conclusions

PT Bahari Biru Nusantara strategically plans inventory and schedules goatfish (*P. heptacanthus*) procurement to address demand fluctuations and maintain smooth production. Raw material documentation involves recording, temperature measurement, organoleptic testing, and microbial analysis. Inventory management also considers environmental factors such as seasons, weather, climate, and resource sustainability.

Acknowledgments

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Conflicts of Interest

The authors declare no conflict of interest

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