

Multimode Transportation of Super Fermented Salted "Jambal" Fish Export from Indramayu, West Java, Indonesia (a Review)

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ABSTRACT

*International trade is one of the main drivers in the success of a country's economic growth. Economic growth can take place well if trade is created and growth itself can produce trade. One type of international trade carried out by Indonesia is the export of fishery products. One of the fishery products that has the potential to be traded is super fermented salted "jambal" fish. Super fermented salted "jambal" fish is a salted fish product through a fermentation process derived from catfish (*Arius thalassinus*). This type of preparation is very popular with consumers, especially consumers in Southeast Asia. The success of the export of fishery products is largely determined by the means and processes of transportation that are carried out. Multi-modal transportation in the process of exporting super fermented salted "jambal" fish from Indramayu to Southeast Asia can be done with various types of transportation modes. The multimodal transportation involved consists of ships, closed cars equipped with refrigerators, open trolleys and closed trolleys. Super fermented salted "jambal" fish export is a profitable and feasible business to do, where transportation is carried out using ships is more profitable than using airplanes.*

Keyword: Multimode transportation, Jambal, Trade route, Indramayu

1. INTRODUCTION

Transportation is very important in various fields of life. The main role of transportation is in economic development. Economic activities, especially trade, are highly dependent on transportation, because they are related to the distribution of trade goods or products. Transportation can be local or international. Local transportation generally uses simple means of transportation, while international transportation uses more sophisticated means of transportation and usually can load a lot, such as ships and airplanes.

International trade is one of the main drivers in the success of a country's economic growth. Economic growth can take place well if trade is created and growth itself can produce trade. Trade cannot occur without the availability of adequate transportation. One of the means of transportation for international trade that has its own advantages is sea transportation because it provides an economy of scale, namely low costs for larger volumes of goods.

One type of international trade carried out by Indonesia is the export of fishery products. The success of the export of fishery products is largely determined by the means and processes of transportation that are carried out. This is based on the fact that fishery products are highly perishable foods. Transportation acts as a tool or media to

distribute various aquatic products, both live fish distribution, fresh fish, and fishery products processing products to various regions. Considering that not all regions have the same potential for aquatic resources, diverse geographical conditions, fishery centers are spread all over the world, while consumers are spread all over the world.

One of the fishery products that have the potential to be developed in the trade sector is super fermented salted “jambal” fish. This type of preparation is very popular with consumers, especially consumers in Southeast Asia. Super fermented salted “jambal” fish is a salted fish product derived from catfish (*Arius thalassinus*). The term super fermented salted “jambal” fish or also known as bread jambal is used because of the character of the texture of the meat which is easily destroyed after frying like toast with a distinctive aroma [1]. And then we call it by the term super jambal. Based on statistical data from the Fisheries Service of West Java in 1998, 72 percent of the catch of catfish in West Java was 4,764.10 tons which were processed into super jambal. This shows that super jambal is very prospective to be developed in the future.

Super jambal fish is currently known to various countries in Southeast Asia, including Singapore, Hong Kong, the Philippines, Thailand, and especially Malaysia. The demand for super jambal from the Malaysian market to the super jambal processing company in Indramayu is the highest demand compared to other countries. Based on this, it is necessary to make an effort to maintain the quality of super jambal well until it reaches the destination of the order, so as not to disappoint consumers.

Efforts that can be made include increasing security and supervision during the super jambal transportation process. To be able to improve supervision during the transportation process, it must be known in advance about the multimodal system used in the super jambal transportation. Thus trading activities can take place smoothly.

2. SUPER FERMENTED SALTED “JAMBAL” FISH

2.1 Super Fermented Salted “Jambal” Fish Processing

Super fermented salted “Jambal” fish for further writing salted jambal also known as salted bread jambal is a salted fish product derived from catfish (*Arius thalassinus*). The term salted bread jambal is used because of the character of the texture of the meat which is easily destroyed after frying like toast with a distinctive aroma [1].

Salted jambal fish is made through a salt fermentation process so that it undergoes changes in weight and distinctive characteristics [2]. The characteristics of salted jambal fish include a fragrant aroma caused by protein and fat degradation which produces methyl ketone compounds, butylaldehyde, amone, amino, and other anonymous compounds. In addition, the high nitrogen amino acid content affects the taste of salted jambal fish. Another peculiarity is the soft and compact texture as a result of the work of proteolytic enzymes produced by microorganisms [3].



Fig -1: Super fermented salted “Jambal” fish

Source: <https://sinoniayu.indramayukab.go.id/perusahaan/sentra-industri-ikan-asin-jambal-roti-karangsong/>

The quality of the aroma and texture of the salted jambal fish is influenced by the processing process which consists of the stages of salting, fermentation, drying, and storage. The fermentation process is the most decisive factor because at this stage there is a precursor to the taste and distinctive aroma of the salted jambal fish caused by the

growth of microorganisms [4]. In the process of salted jambal fish, it is often found that catfish (*Arius thalassinus*) as a raw material is not known for the number and type of microorganisms as an indicator of the level of freshness. This causes the salt fermentation which should produce a soft texture and distinctive aroma has not been achieved optimally. Therefore, information on the number and types of microorganisms starting from fresh fish, during fermentation and in the final product of salted fish jambal roti is very necessary so that the purpose of the fermentation process is achieved.

2.2 Super Salted Jambal Fish Production Requirements for Export

In order to obtain super jambal products with steady and stable quality, the processing must be carried out rationally and standardly. Rationalization and standardization should be carried out starting from raw materials, auxiliary materials, processing processes, to the processing environment. With standardization, consumers will get products that are in accordance with what they should be. This condition will also open up opportunities for the development of marketing for traditional processed products, including overseas [5].

Quality and quality assurance are part of modern life. Therefore, in the global constellation of the modern world today, the concept of quality must be applied in every community activity, including in the development of traditional processed fish products, including super salted jambal fish.

Processors should be taught to understand the basic principles of proper processing, and accustomed to doing so, so that a product quality assurance system can be implemented. A quality assurance system based on critical control point hazard analysis (HACCP) which has become a must for export products to America, and has only been applied to processed products from large industries, is not impossible to apply to traditional processing. The concept begins with identifying potential hazards, then making a HACCP plan by compiling an audit table whose components consist of process flow, possible risks or hazards at each stage of the process, critical control points for each risk or hazard, and controls that must be carried out [5].

Increased knowledge and technology makes countries that will import products from Indonesia in particular set high food standards for sanitary, hygienic, healthy, and safe. Consumers demand that food products are produced, processed and packaged in clean conditions and remain viable throughout the distribution chain. Strict health demands on the handling and distribution of the food they will consume encourage everyone involved to be required to understand and learn to fulfill them.

Every processing industry and people working in the fishery product processing industry must have a food handling certificate, for example Code of Practice: Good Handling Practices (GHP), Good Processing Practices (GMP), Good Commercial Practices (GCP), Good Transportation Practices (GTP).

Good Transportation Practices (GTP) Model Code, Provides guidelines in the processing, packaging and storage of human food which will be subject to government regulations requiring that food be prepared, packaged and maintained in sanitary conditions. Persons in charge of food transportation are indirectly subject to this control. Must meet the specified requirements, namely preventing contamination, protecting the product from damage or decay and damage caused by containers, and the transportation used is adjusted to the purpose.

3. SUPER FERMENTED SALTED “JAMBAL” FISH PACKAGING

3.1 Super Fermented Salted “Jambal” Fish Packaging Material

Determining the protection function of the packaging needs to consider aspects of the quality of the product to be protected. The function of the packaging must meet the main requirements, including the ability of good wrapping power to facilitate handling, transportation, distribution, storage and preparation or stacking. The ability to protect its contents from various risks and pressures from outside [6].

The container or packaging for super jambal fish consists of two packages, namely primary packaging and secondary packaging. Primary packaging is packaging that is in direct contact with super jambal products, namely packaging made from polyethylene plastic. While secondary packaging is packaging that is not in direct contact with

the product, secondary packaging used for super jambal fish generally is packaging made of cardboard material known as corrugated paper, wood or boards made of *Pine* sp. or jenjing material can also be used with coated by plastic to prevent water from entering the product.

Packaging materials must have requirements, namely non-toxic, must match the packaged material, must ensure sanitation and health requirements, can prevent counterfeiting, ease of opening and closing, ease and safety in removing contents, ease of disposal of used packaging, size, the shape and weight must be appropriate, and must meet the requirements, namely packaging intended for tropical areas has different requirements from packaging intended for subtropical or cold regions. Likewise for areas with high humidity and dry areas.

Based on its function, packaging is divided into two, namely packaging for transportation and distribution (shipping/delivery package) and packaging for retail trade or supermarkets (retail package). The use of materials and the choice of packaging designs for transport and distribution will differ from those for retail trade. Packaging for transportation or distribution will prioritize materials and designs that can protect against damage during transportation and distribution, while packaging for retail will prioritize materials and designs that can attract consumers to buy [7].

3.2 Packaging Technology

Packaging helps in maintaining the quality of super jambal fish. Packaging will prevent moisture in the fish and reduce the possibility of fat oxidation and mold growth. Good packaging can reduce damage due to rough handling and prevent contamination and dirt by other substances that can be detrimental to health and economic loss.

Proper packaging is essential to maintain low moisture content and to prevent product spoilage due to microbial growth. Before being packaged, the product must be cooled first, to prevent condensation in the package [8]. Packaging for super jambal fish is done using corrugated paper for non-vacuum packaging system. As for the super jambal fish that were vacuumed, the packaging was done using polyethylene plastic.

3.3. Storage and Warehousing

Super jambal fish as well as fresh fish cannot be separated from the possibility of damage. Damage is caused by microorganisms, namely bacteria, fungi, or due to oxidation. So even though it has been treated with salt, the quality of super jambal can decrease if it is not stored properly.

Jambal super damage is mostly caused by fat oxidation so that the fish smells rancid. Jambal super fish is a type of processed fish that contains high fat, so it is easy to oxidize when the storage temperature is high enough and exposed to sunlight. Humid air also causes mold to grow. Therefore jambal super must be stored in a cool (cold) place. Better stored at temperatures between 5-15°C (chilling temperature). Chilling temperature can increase the shelf life of super jambal fish from 2-3 weeks at room temperature to more than one year at house refrigerator temperature. Super jambal fish that are stored longer, at certain times should always be checked.

The storage process in the warehouse or also known as the warehousing of super jambal fish is carried out using a first in first out (FIFO) system. Super jambal fish that are produced first are stored in a forward position, so that when transportation is going to be carried out, the fish that are transported first are the fish that were produced earlier. Proper storage will protect the product from insects and rodents.

4. MULTIMODE TRANSPORT ANALYSIS

4.1 Means of Transportation

According to the International Multimodal Transport of Goods Convention, Article 1 paragraph (2), multimodal transportation is essentially a way of transporting goods using at least 2 (two) (different) modes of transportation based on one multimodal transport agreement document, goods are transported from one place or country to another place or country where the goods will be delivered. In multimodal transportation, the goods being transported, the risks that arise are transferred to the multimodal transport operator.

Transportation is generally divided into three ways, namely land, sea, and air transportation. Land transportation is done for super jambal fish transportation in a short distance, such as from the processing industry to the port. In land transportation, there are means of transportation that help in the process of transporting super jambal fish from the processing site, drying area, transportation to the warehouse and from the warehouse to the car for further transportation.

Sea transportation is carried out using ships and speed boats, generally carried out to transport jambal super fish to various islands and abroad in transportation for export. Meanwhile, air transportation using airplanes is almost never done for the export of super jambal fish products because the operational costs are very high.

At this time, although air transportation has become so sophisticated and fast, sea transportation still plays a very, very important role and is even more important. The need for food and clothing for people who are scattered in many places is more easily served by sea transportation. The mobilization of merchandise using containers, the mobilization of gigantic industrial equipment ranging from turbines to power plants to rigs/bridges, can be carried out by utilizing sea transportation which knows almost no limits on weight and dimensions. According to [9], sea transportation plays an important role in the world of international and domestic trade. Sea transportation also opens access and connects island areas, both developed and isolated areas.

4.2 Super Salted Jambal Fish Export Transportation Route

Jambal super fish is produced in the fishery product processing industry area in Indramayu, West Java. More precisely in the village of Eretan Wetan Indramayu. Super jambal fish products have long been known by the public, because of their delicious taste. At this time, super jambal is already known by people outside Indonesia. One of them is Malaysia. Many Malaysians like super jambal fish, so the demand for super jambal exports to Malaysia is increasing.

Based on this, in order to keep the supply of super jambal to Malaysia going continuously, it is necessary to know the transportation route for the export of super jambal from Indramayu to Malaysia properly. The super jambal fish transportation route from Indramayu to Kuala Lumpur passes through several areas. The order of the areas traversed is that the Super Jambal fish was transported first from Indramayu to Tanjung Priok Port, North Jakarta. Then transported by sea to the Port of Kelang Malaysia. After arriving at Kelang Harbor, super jambal is transported back by land transportation to the Kuala Lumpur fish market. During transportation on this route, the quality of super jambal fish must be maintained properly.

4.3 Multimodal Transportation Super Salted Jambal Fish Export

Transportation of super jambal fish exports from Indramayu to export destination countries is carried out using several types of transportation. The modes of transportation used are ships, cars, and various kinds of trolleys or transport wheels.

In practice, the application of this mode of transportation is divided into several groups of places. In one location group, there are more than two types of transportation modes. The group of locations consists of the location of super jambal fish processing, the port of Tanjung Priok, and the port of the destination country until it arrives at the destination for the super jambal fish delivery, namely the fish market.

At the location of the super jambal fish processing industry, there are two modes of transportation with three uses. Fish from the Fish Auction Place are transported to cars by trolleys. After arriving at the industrial site, the fish are unloaded from the car and transported to the super jambal fish processing plant. The processed fish are then stored in the storage warehouse.

Multi-mode transportation in the process of exporting super jambal fish from Indramayu to countries in Southeast Asia can be done with various types of transportation modes. The multimodal transportation involved consists of ships, closed cars equipped with refrigerators, open trolleys and closed trolleys. The transportation cars used consist of two types, namely closed box cars which are small in size, used for transporting raw materials and transporting

products over short distances. The other type of car is a large container car, which is used to transport super jambal fish for export purposes and for long distance transportation trips, for example for inter-island transportation. Both types of cars are equipped with coolers.

5. CONCLUSION

One of the fishery products that has the potential to be traded is super fermented salted “jambal” fish. This type of preparation is very popular with consumers, especially consumers in Southeast Asia. Super Jambal fish is a salted fish product derived from catfish (*Arius thalassinus*). The container or packaging for super jambal fish consists of two packages, namely primary packaging and secondary packaging. Primary packaging is packaging that is in direct contact with super jambal products, namely packaging made from polyethylene plastic. While secondary packaging is packaging that is not in direct contact with the product, secondary packaging used for super jambal fish is generally packaging made of cardboard material known as corrugated paper, wood or boards made of *Pine* sp. or jengjing material can also be used with coated by plastic to prevent water from entering the product. Packaging, storage and warehousing are things that must be considered because they will affect the quality of the product to be transported. Multi-modal transportation in the process of exporting super jambal fish from Indramayu to export destination countries can be done with various types of transportation modes. The multimodal transportation involved consists of ships, closed cars equipped with refrigerators, open trolleys and closed trolleys.

REFERENCES

- [1]. Burhanuddin, S., A. Djamali, S. Martosewojo and M. Hutomo. (1987). “Sumber Daya Ikan Manyung di Indonesia”. Lembaga Oseanologi Nasional – LIPI. Jakarta.
- [2]. Burgess, G.H.O., C.L. Cutting, A. Lovem and J.J. Waterman. (1965). “Fish handling and processing”. Ministry of technology. Torry research station Edinburgh.
- [3]. Rahayu, P.W., S. Ma’oen, S. Fardiaz. (1992). “Teknologi Fermentasi Produk Perikanan”. Departemen Pendidikan dan Kebudayaan. Direktorat Jenderal Pendidikan Tinggi. Pusat Antar Universitas Pangan dan Gizi. IPB. Bogor. 140p.
- [4]. Rochima, E. 2005. “Dinamika jumlah bakteri selama fermentasi selama processing ikan asin jambal roti”. Jurnal Akuatika, Vol. 1, pp. 1-6.
- [5]. Heruwati, E.S. (2002). “Pengolahan Ikan Secara Tradisional. Pusat Riset Pengolahan Produk dan Sosial Ekonomi Kelautan dan Perikanan” (<http://www.pustaka-deptan.go.id>)
- [6]. Supriyono. (2003). “Mengukur Faktor – Faktor dalam Proses Pengeringan”. Gramedia. Jakarta
- [7]. Peleg, K. (1985). “Produce Handling Packaging and Distribution”. The AVI Publishing. Co. Inc. Westport. Connecticut.
- [8]. Syamsir, E. (2008). “Bahaya dan Keuntungan Kemasan Primer”. Tabloid Peluang Usaha, Vol. 3, No. 24, pp.11-24.
- [9]. Kusumastanto, T. (2003). “Kebijakan Transportasi Laut di Negeri Bahari”. Artikel Kompas. Jakarta.