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Review article "KNITTED MEAT CANNING"

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Abstract

Canning of knitted meat is intended to deal with the perishable/rotten nature of knitted meat. This article aims to get information about the stages of canning knitted meat. Based on the literature study obtained innformation that the stages of canning knitted meat are as follows: acceptance, sortation, final checking of raw materials, mixing, meat filling, weighing, can closure, coding, pasteurization, cooling, packaging or packing, cold storage and transportation of which the product is then marketed To supermarket and *seafood restaurant*.

Keywords : mixing, filling meat, weighing, closing cans, coding

INTRODUCTION

One of the potential fisheries sectors is rajungan. Rajungan is classified as a seabed animal that can swim near sea level at night to find food, rajungan is also often called *swimming crab* which means crab. swimming. In general, rajungan has a flat round carapace with a very interesting color, has a carapace that amounts to seven to nine, one pair of capit, one pair of swimming legs, and three pairs of walking legs.

Currently rajungan is ranked third to fourth from the total export value of fishery products after shrimp (46%), tuna (14%) and seaweed. The total export value of rajungan fishery commodities contributes more than US $ 260 million or around Rp. 2.47 trillion per year. Knitting products are in great demand in many countries in the world, such as the United States, China, Japan, Hong Kong, South Korea, Taiwan, Malaysia and european union countries.

Rajungan is one of the fishery products that are generally *perishable food* (easily damaged / rotten). Decay will occur immediately after the animal dies if not done good post-harvest processing and handling. Therefore, one of the knitting processing businesses that have a high export value is in the form of frozen knitting or packaged in cans.

Canning is one form of modern fish processing and preservation that is packaged hermatically and then sterilized (Sahubawa & Ustadi, 2019). In food preservation, technically there are several ways that use microbiological principles, namely by reducing the number of microorganisms to a minimum, reducing contamination of microorganisms. , as well as creating an environmental atmosphere that is not liked by microorganisms. Fish canning has indeed been done by many companies or institutions engaged in fisheries, one of which is canning knitting. Canning knitted meat is a heating process and radiation of knitted meat which is one of the processing methods to save fish from the decay process so that it can be used. Over a long period of time using pasteurization to inactivate microbes that are resistant to high temperatures. This article aims to get information about the stages of canning knitted meat

Classification and Morphology of Rajungan

Rajungan is one of the phylum members of crustaceans that have a multi-pronged body. The classification of rajungan (*Portunus pelagicus*) according to Saanin (1984) is as follows:

Phylum : Arthropods
Grade : Crustaceans
Subclass : Malacostraca
Order : Eucaridae
Suborder : Decapoda
Family : Portunidae
Genus : Portunus
Species : *Portunus pelagicus*

Figure 1. General Form of Rajungan

Rajungan has a very prominent carapace compared to its abdomen. The abdomen is triangular (tapering in males and dilated in females). On both sides of the carapace face there are 9 thorns called marginal thorns. Knitted legs totaling 5 pairs, the first pair of legs turned into capit (*cheliped*) which is used to hold and put food in his mouth, pair of legs to 2 up to 4 to be the foot of the road, while the fifth walking pair serves as a rower or swimming equipment, so it is often referred to as a swimming crab (*swimming crab).*). The swimming legs in the female rajungan also serve as a means of egg holder and incubation (Oemarjati and Vishnu 1990).

Rajungan (*Portonus pelagicus*) which comes from the family Portunidae according to Moosa (1981) is described as having the following diagnostic picture: Carapace consists of large spines on the left and right. *Anterolateral* jagged five to nine pieces. Rajungan has carapace that amounts to seven to nine. It has one pair of capit, one pair of swimming legs, and three pairs of walking legs. In distinguishing the sex, it can be seen from the shape of the abdomen. Female rajungan has a dilated and rounded abdomen with a frill that is useful for storing eggs, while the male rajungan has a narrowed abdominal shape. Hatched knitted eggs, the cubs do not immediately become like their mother but become larvae.

In general, rajungan has a flat round carapace with a very interesting color. Male rajungan has a bluish carapace color with bright white patches, while for female knitting has a brownish green color with less bright white patches compared to male rajungan (Nontji, 1993). In accordance with the statement of Mizards (2009), male knitting has a brighter blue color than female knitting that is brownish green. At the same age the size of the male rajungan is larger than that of a female rajungan. Mossa (1990) added that the difference between male

and female knitting can be known from the size of the body and the color of the knitting. The body of the male rajungan is larger and the male knitting capit is longer compared to the female rajungan. The difference that can be seen clearly in the rajungan which is rather large in size even though it is not yet mature, namely the color of the carapace, for the color of the male knitting is blue. with white patches and knitting females are brownish-green.

The size of the knitting varies greatly depending on the region and season in the rajungan habitat, for the level of development of the rajungan based on the width of the carapace is divided into three, namely juvenile with a carapace width of 20-80 mm, towards adulthood with a carapace width of 70-150 mm and an adult knitting carapace width reaches 150-200 mm (Mossa, 1980).

Rajungan distribution areas in Indonesia are mainly found on the east coast of Sumatra, the north coast of Java and the coast of South Sulawesi, with rajungan production centers in Northern Java, East Sumatra, East Kalimantan and South Sulawesi (Nugroho, 2020). Rajungan is spread over a very large area and lives in a nested habitat to a seagrass habitat with a sandy to muddy substrate (KKP 2016). Young rajungans are found in coastal waters with relatively shallow depths, while in deeper waters adult rajungan are found (Setyawan and Fitri, 2018).

Processing Of Knitting Meat Canning

Canning knitting is a way of preserving foodstuffs that are packaged in hermitis and then sterilized. In food preservation, technically there are several ways that use microbiological principles by reducing the number of microorganisms to a minimum, reducing contamination of microorganisms, creating an environmental atmosphere that is not favored by microorganisms with heating and radiation. Destruction of microorganisms by heating the canning process in their inserts causes protein denaturation and deactivates enzymes that help metabolic processes (Pandelaki 2016).

According to the National Standards Agency (2010) based on SNI.6929.2:2010, the stages of processing rajungan include receipt, washing, cleaning I, cooling, sorting I, cleaning II, filling, weighing, can closure, pasteurization, cooling, sorting II, labeling I, packing, packaging, storage. Another case according to Moeljanto (1992) which states that the stages of the canning process usually include receipt, sorting, final checking of raw materials, mixing,

filling meat, weighing, can closure, coding, pasteurization, cooling, packaging or packing, cold storage and transportation.

Processing of canning knitted meat consists of several processes, namely as follows:

a. Receiving

Preparations are carried out starting from raw materials and auxiliary materials in accordance with the procedures that absolutely must be done. Raw materials received must still be alive and free from contaminated materials and must have raw material criteria that are in accordance with the requirements (Ristyanadi and Hidayati 2012). The raw materials received from several *suppliers* are already in the form of cold boiled knitting. The quality of raw materials must be clean, free from any odors that indicate decay, free from signs of decomposition and counterfeiting, free from other natural properties that can be degrade quality and do not harm health (Masengi *et al.*, 2018). The raw materials are stored in a fiber box and styrofoam with ice in each layer to maintain the temperature of the knitted meat so that the quality remains good. The temperature obtained can meet the standard set in SNI, which is <5 °C.

b. Sorting

Sorting is the process of separating red meat with white meat based on the type and size of knitted meat and the separation of meat types because each type of meat has a good grade and price. different. According to Akhmadi (2006) sorting is done on all types of meat by separating objects other than meat such as shell fragments, gills, dirt, eggs and foreign objects. Others such as pebbles, hair and pieces of insect body parts from meat. Supervision measures are carried out by checking and recording the temperature of raw materials with a temperature of < 21 °C and still maintaining the room temperature of 18 °C – 26 °C and the supply of ice so that the cold chain remains maintained and quality remains good (Sahubawa & Ustadi, 2019).

c. Final checking

Final checking is a recheck of knitted meat in a dark room to repeat shell checks that are still left behind in the sorting process aimed at ensuring whether or not the knitted meat passes (Gunawan 2010). Meat that has been sorted and has been separated based on the type of meat is then placed in a tray with a *supplier* code label.

d. Metal detecting

Metal detecting is checking meat by passing trays filled with meat on the metal detector machine one by one, making sure there is no metal in the meat (Sipahutar *et al.,* 2021).

e. Mixing

Mixing is the process of mixing meat from one *supplier* with another *supplier* that aims to equalize the quality of knitted meat, to get a mixture of knitted meat that has uniform quality and avoid the presence of products with meat contents that are all not of good quality. The formulation of mixed knitted meat has been determined according to the type of meat and the established standards. This process is done manually by hand with the temperature of the raw material maintained , namely < 21 °C (Maurina *et al.,* 2021). The reason for using the temperature is because the temperature < 21 °C can still inhibit the growth of *stapphylococcus* bacteria and follow the fda's determination .

f. Filling

Filling is the process of filling meat in cans based on the type of meat or product. The canning process also regulates the meat in the can so that when the *customer* opens the can looks attractive and neat. This process is carried out on a *stainless* table where it has been given ice to maintain the temperature of the meat. Cans specifically used for pasteurization fishery products packaging are made of *polyprophilene homopolymer* plastic (Setyowati & Widodo, 2017).

In this filling process, the addition of SAPP (*Sodium Acid Pyrophosphate*) is carried out which serves to prevent oxidation which is characterized by the color of knitted meat to blue. The second function of SAPP according to Mar-Less (2006) in Akhmadi (2006) is to prevent the formation of *struvites*. *Struvites* is a sandy-like taste that can sometimes be felt in knitted meat. This is due to the magnesium component in knitted meat that can crystallize.

g. Weighing

Weighing is a weighing process that is carried out after the can is fully filled with meat according to company standards. Accuracy in the weighing process must be considered and use calibrated scales. The right product weight in each operation will instill consumer confidence in the resulting product. Final weighing is done to ensure the net weight of the product and prevent the final product from becoming too heavy.

h. Seaming

After the weighing process is completed, followed by the process of closing the can (*seaming*). The closure of the can is one of the important processes because if it is not done properly and properly, it allows leakage during the pasteurization process that will affect product and accelerate the durability of the product. Closing the can using a seamer machine. The quality of the product depends heavily on the efficiency of the seamer machine. To control the efficiency of the machine, check the size or dimensions of the can every 1 hour. It should be done carefully during the closing of the can and should be checked against the folds of the can aimed at preventing leakage due to *seaming* machines.

i. Coding

Coding is the process of giving code on a can using a *coding* machine. According to Akhmadi (2006), coding is done after the can is closed. The purpose of coding is to facilitate *traceability* in case of product problems. The provision of the code must correspond to the ongoing production code and the position of the code must be precise and clear at the bottom of the can. The ink used is black, waterproof and in accordance with company standards. The working principle of *the coding* machine is to set the code on the computer screen, drain the can to the *printing* funnel, after the can passes through the code funnel will be visible in the section under the can. The codes used are company code, production hours, export destination code, production date, month and expiration year.

j. Pasteurization

According to Fardiaz (1988/1989) pasteurization is a heating process that can kill some of the body of the renic contained in food, the temperature is below 100°. The heating process can be done using water vapor, hot water, dry heat, or electricity, and the product must be cooled immediately after the heating process. Canning crab meat uses pasteurization to inactivate microbes that are resistant to high temperatures. According to Winarno (1994) and Nurjanna (2001) the process of heating canned eating that is considered safe is what can guarantee that the meal is free of *clostridium botolinum* bacteria.

Pasteurization is carried out by boiling / cooking meat in cups in pasteurized tanks at a temperature of 186 °F – 189 °F for 155 minutes. Before carrying out the process and before the arrival of the cup in the pasteurization process. The pasteurization process is carried out so that the central temperature of the product reaches 85 °C (185 °F) minimum for 1 minute according to SNI 6929: 2016 (BSN 2016).

k. Chilling

Cooling is a *thermal shock* treatment in products with cooling at temperatures in accordance with the standard of 32 °F – 38 °F for 160 minutes using clean water containing chlorine 1-3 ppm about 40-60 ml and plus ice blocks on the *chilling* tank. Cooling aims to prevent *over cooking* or *over processing*, namely knitted meat experiencing too advanced cooking which results in the taste, color, and texture of the meat (Maurina *et al.* 2021).

l. Packing

Packing is the process of packaging products into AN MC (*master carton*). MC is secondary packaging after canning which is primary packaging that comes into contact with the product, the function of secondary packaging is to protect primary packaging during storage, transportation and distribution. The attachment of barcodes to MCs must be considered, the attachment of the barcode must be in accordance with the type of product and production code. Packing is also carried out with the aim of adding to the attractiveness of the product (Maurina *et al.* 2021).

m. Storage

Products that have been labeled and included in the *master carton*, stored in *a cooling* room (chill *storage*) to maintain good product quality until the time of delivery. The storage temperature is -1.1°C - -2.2 °C aims to prevent pathogenic bacteria from developing and can also increase the shelf life of the product (Maurina *et al.,* 2021). Storage of the final product requires storage space equipped with a cooling machine to maintain product quality. The arrangement of cardboard should not exceed the dividing line and the procurement of the distance between the wall and the product should not be in direct contact. The final product storage preparation pattern can use a pallet rack system, which can systematically organize and store products , making it easier to disassemble (Haz, 2021).

n. Loading

The product is arranged in such a way by being given a hole gap so that the air circulation in the container is maintained.

Quality and Standards of Knitting Meat Canning

The quality of a product is the physical condition, function and nature of a product concerned that can meet the tastes and needs of consumers satisfactorily according to the value of money that has been spent (Prawirosentono, 2002).

Rajungan quality standards that are usually used in knitting canning companies are types of *Portunus pelagicus*, knitting in a living or fresh state, not binoculars and not in *moulting* condition, there is no foreign odor (smell of kerosene, diesel, ammonia, etc.), meat is not in a soft or crushed state.

Fresh rajungan has a clean appearance, does not smell rotten, the flesh is white contains yellow fat, and is free of preservatives. The knitted flesh that began to rot was visible from the pale skin color, open and stretched, the meat dried up, and there was no more liquid in the skin, color meat turns blackish and stinks (Anonymous, 2007).

Based on SNI 01-6929.2-2002 raw materials for knitted meat in pasteurized cans are fresh knitting with good quality. The type of raw material used is rajungan (*Portunus pelagicus*). The form of raw materials in the form of fresh knitting that has not undergone weeding or other processing. The origin of raw materials from waters that are not polluted by chemical, biological and physical pollution. The quality of raw materials must be clean, free from any odors that indicate decay, free from signs of decomposition and counterfeiting, free from other natural properties that can be Lower quality and do not harm health.

According to Moeljanto (1992), organoleptically raw materials must have freshness characteristics such as full, clean, brilliant, hard shell, sturdy and strong. In addition, it should also smell fresh specific type. To maintain the quality of raw materials, knitting must be handled as soon as possible, if forced to wait for further processing , the raw materials must be stored in containers that are well and still maintained the temperature with the appropriate cooling method so that the central temperature of the raw material reaches a maximum temperature of 5 °C, sanitary and hygienic.

According to BBPMHP cit Mirzads (2009), knitted meat obtained is usually classified into three levels of quality, namely:

a. Quality 1 (super / jumbo meat), which is the body meat located at the bottom (related to the swimming legs) in the form of a large white blob.
b. Mutu 2 (regular meat), which is body meat in the form of fragments, is located in the barriers of white body cavities.
c. Mutu 3 (red meat / *clawmeat*), which is knitted meat that is on the legs and capit, is reddish white.

Conclusion

Based on the literature study obtained by innformation that the stages of canning knitted meat are as follows: receipt, sorting, final checking of raw materials, mixing, filling meat, weighing, closing of cans, coding, pasteurization, cooling, packaging or packing, cold storage and transportation of which then products are marketed to supermarkets and *Seafood Restaurant*.

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