



## REVIEW ; KAMABOKO PRODUCT REVIEW

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### ABSTRACT

Kamaboko is a food that has a gel shape and chewy made from fish meat. This product is very popular with most Indonesians. This review article aims to get information about the types of kamaboko, the quality of kamaboko and the development of kamaboko products from research results. Based on literature studies obtained information that the types of kamaboko consist of *Itatsuki kamaboko*, *Fried kamaboko*, *Chikuwa* and *Hanpen*. The quality of kamaboko can be seen from organoleptic and chemical parameters. The higher the protein content and the lower the fat, the higher the quality of kamaboko. Kamaboko product development can be done with the addition of caragenan and ISP to get more chewy kamaboko products.

### KeyWords

Chewy, quality, organoleptic, protein, fat.

### 1. INTRODUCTION

Kamaboko is a food originating from Japan that has a gel and chewy shape [1]. Kamaboko is a product that has a high protein and low fat. Kamaboko is served as a meal or side dish companion.

Kamaboko is made from fish meat that has been crushed or also from surimi. Fish that are often used in the manufacture of kamaboko is fish that are white fleshy, low in fat and high in protein. All types of fish can be used as the manufacture of kamaboko, but each fish has a different suppleness and elasticity. The meat used to make kamaboko if it uses red meat and has high fat then its characteristics and properties will have an effect on the processing process, especially in the formation of low gels.

Fish meat has a fishy aroma caused by a high proportion of meat and fat. The formation of gel in red meat fish is due to the high sarcoplasm [2]. The manufacturing process in kamaboko products is by means of cooking, steaming, roasting, frying or boiling [3].

Kamaboko is a food that is prioritized to maintain the stability of fish meat myofibril protein formed by a gel that is cohesive, sturdy and has a chewy and compact texture [2]. Myofibril protein is the largest protein in fish tissue, where it dissolves in salt. Myofibril protein is the largest tissue in fish meat that can dissolve in a saline solution. This protein consists of myosin, actin and regulatory proteins. The combination of actin and myosin can form actomyosin. This protein can help for muscle contraction [4].

Kamaboko products are similar to processed fish products that have long been known in Indonesia, including empek - empek, fish meatballs, brains - brains, and others. Kamaboko can be made with a variety of shapes, colors and flavors depending on the seasoning and heating method used [3]. This review article aims to get information about the types of kamaboko, the quality of kamaboko and the development of kamaboko products from research results.

## 2. KIND OF KAMABOKO

Kamaboko has a varied shape and can be distinguished by the way of ripening and the shape of kamaboko. According to [3] kamaboko can be classified based on the shape and how it is cooked, namely as follows:

### 1) *Itatsuki kamaboko*

Itatsuki kamaboko is a meat paste stacked on a thin plank mold made of wood. This type of kamaboko is heated by steaming for about 80-90 minutes for large sizes and 20-30 minutes for small sizes.

### 2) *Fried kamaboko*

Fried kamaboko is a meat paste that is whipped with a variety of additional ingredients. Kamaboko is formed and fried in soybean oil, which serimg is called tempura. The material used to make this type of kamaboko is of lower quality compared to Itatsuki kamaboko.

### 3) *Chikuwa*

Chikuwa is a kamaboko that is printed in the shape of a tube and cooked by roasting. Chikuwa has a white color on the inside and golden brown beyond its surface. This kind of kamaboko raw material is inferior to Itatsuki kamaboko.

### 4) *Hanpen*

Hanpen is one type of kamaboko that has a white color and is like a coral flower. A distinctive feature produced by hanpen is to mix air into the paste during the grinding process.

## 3. KAMABOKO QUALITY

An important quality in kamaboko products is the nature of its *ashi* (elastic) texture and factors that can affect *ashi* kamaboko, including the type of fish used, the ingredients added at the time of making kamaboko [5]. The main factor that can affect the suppleness properties of kamaboko products is fish proteins that will be denatured because of something that can affect the strength of kamaboko gel.

The manufacture of kamaboko ingredients such as ice water and salt is needed, where ice water serves to help the formation of kamaboko dough and is also able to maintain kamaboko suppleness. The use of ice water can maintain the temperature to remain low so that there is no denaturation of proteins due to the movement of the grinding machine in fish meat [6]. Salt has a function as the formation of gel dan adds to the taste of kamaboko. Salt is given at the beginning of grinding which aims to increase the adhesion of fish paste, while salt given in the final process of grinding, then the adhesion properties will decrease [3]. The use of salt serves as a preservative that can kill microorganisms and give taste to food with the amount used in the manufacture of kamaboko ranging from 2% – 3% [3] and to improve the texture of the fish meat [7] [8].

Factors that can affect the quality of kamaboko production results according to [9] are as follows:

- 1) The degree of elasticity that can affect the taste, durability of the product and appearance.
- 2) Fish that has excellent freshness is a quality factor that can produce good products.
- 3) The taste is influenced by the type of fish used, the level of freshness, and the composition of the ingredients that have been given.
- 4) Salt levels range from 2.5% - 3.5%, low salt will produce kamaboko with a poor texture and vice versa if the salt given is too high eat the taste becomes too salty.
- 5) Kamaboko can be stored for a long period of time, then storage is required at low temperatures.

Kamaboko food quality and safety requirements based on SNI 7757:2013 can be seen in Table 1.

Table 1. Kamaboko Food Quality and Safety Requirements

Test Parameters	Unit	Requirement
<b>a. sensories</b>	-	Min 7 (Score 3 – 9)
<b>b. chemistry</b>		
Water Content	%	Max 60.0
Ash Content	%	Max 2.0
Protein Levels	%	Min 5,0
Fat Content	%	Max 16.0

(Source: BSN)

## 4. KAMABOKO MAKING

Kamaboko is made from fish meat that is ground as the main ingredient and the addition of ingredients such as starch, sugar and salt. The process of processing kamaboko is cooking by steaming (*mushi-kamaboko*), roasting (*yaki-kamaboko*), boiling (*hanpen*) and frying (*satsuma-age*) [10]. Over time, kamaboko was made from surimi as its main raw material [5].

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According to research [11] the manufacture of Surimi is as follows:

1. Fish weighed
2. Fish fillets, the separation of meat from the bones, fish, head and stomach contents of the fish, until it gets 500 grams of fish meat, then weighed again.
3. Grease the fish meat washed first
4. Fish meat is crushed using *a food processor/blender*
5. Grease fish meat washed using ice water 3 times and added salt at the end of washing by 0.2%, so as not to denaturation of protein. The frequency of washing is a comparison of fish meat and water 1:3 and soaking is done 10-15 minutes while stirring.
6. The washed meat is then removed water by filtering and then squeezed using a filter cloth / blacu.
7. Transfer the meat to the container, added sugar as much as 3-4% and salt 0.2-0.3% using *a food processor*.
8. Surimi is put and packed in polyethylene plastic and stored in *the freezer* with a temperature of -17°C

After the process of making surimi, then the surimi is left for approximately one day in the *freezer*. Surimi that has been frozen, can then be reprocessed into kamaboko products.

The stages of making kamaboko according to research according to [12] are as follows:

1. Fish surimi made added salt as much as 3% (15 grams)
2. Stir the surimi until evenly using *a food processor*.
3. Kamaboko is printed using *stainless stell* cube mold.
4. Kamaboko steamed using a 40°C *temperature streamer/pan* for 30 minutes.
5. Kamaboko is twisted and then directly put in the ice water to stop the cooking process.
6. The twisted Kamaboko is stored in the *freezer* at 10°C for one night before testing.

With the development of the times, the manufacture of kamaboko has been modified a lot. According to [13] entitled "Physical Quality and Microstructure of Kamaboko Ikan Kurisi (*Nemipterus nematophorus*) with karaginan addition" the manufacture of kamaboko is as follows:

1. Frozen surimi is thawed at 5°C for overnight then left at room temperature for 3 hours.
2. Salt added as much as 2%, sucrose 1%, tapioca flour 10% and 1.5% caraginan in 4 treatments (kappa karaginan, lota karaginan, commercial caraginan and without addition of caraginan)
3. Mixing ingredients is done using *a food processor* for 1 minute, and 20% ice is added.
4. Kamaboko dough is poured into a box *stainless steel* mold, then steamed at a temperature of 90 – 95°C for 30 minutes.
5. Steamed Kamaboko is then cooled by soaking in ice water to avoid *over cooking*.
6. Cut the cube-shaped kamaboko by 4 cm and packed using polyethylene plastic.
7. Store kamaboko in *cold storage* (-18°C).

The stages of making kamaboko according to research according to [14] entitled "The Effect of the Addition of Soy Protein Isolates on the Characteristics of

Kamaboko Ikan Barramundi (*Lates calcalifer*)" are as follows:

1. Grease the meat that has been crushed and squeezed and then added isp with the amount of treatment (0%;4%;8%;12% and 16%).
2. Sugar is added as much as 3% and salt 3% to the meat pulp.
3. Kamaboko dough is put in kamaboko mold and steamed at 40°C for 30 minutes, then the temperature is raised to 90°C for 20 minutes.
4. Kamaboko is cooled with ice water with a temperature of ≤5°C for 10 – 15 minutes.

## 5. KAMABOKO PRODUCT DEVELOPMENT FROM VARIOUS RESEARCH RESULT

The results of research obtained in the research of [12] said that the frequency of washing can affect the characteristics of catfish surimi gel. Washing done 3 and 4 times gives better gel characteristics compared to washing 1 and 2 times.

Results obtained in [13] said that with the addition of caraginan in kamaboko products can improve physical quality with physical quality characteristics for folding test by 5, bite test 7;9, gel strength 2872.62 g / cm<sup>2</sup> and white degree 73.78. The results of microstructures in kamaboko products with SEM (*Scanning Electron Microscopy*) at 1000X magnification show that kamaboko products without the addition of caraginan have a dense stringy structure while kamaboko with the addition of kappa karaginan has a porous structure with rather large pores that produce a chewy kamaboko texture and kamaboko microstructure coupled with karaginan iota has a porous structure with more porous pores. small so that the resulting kamaboko product has a soft texture.

The results of research obtained in the research of [14] said that the kamaboko of barramundi fish added with ISPs (*Soy Protein Isolate*) has a real influence texture, where for the strength of the gel in the addition of ISPs 8%;12% and 16% has met the requirements of SNI with a gel strength value of at least 600 gf / cm<sup>2</sup>. . The result for the highest moisture content is obtained by without the addition of ISPs which is 83.56% and the lowest is at 16% treatment which is 72.42%. This shows that the higher the addition of ISPs, the less water content in kamaboko. The result for the average fat content was 3.49% to 3.82% which indicated that the addition of ISPs did not affect kamaboko fat levels. Protein levels showed that the 16% treatment was the highest value of 17.55% and the lowest at no treatment at 7.55%. This indicates that the higher the addition of ISPs, the higher the protein levels will increase. The lowest ash yield was at no treatment at 3.11% and the highest at 16% treatment at 3.71%. This shows that the higher the addition of ISPs, the ash content will increase. The addition of 12% ISP is the best sensory characteristic because on color, taste texture and overall reception can be preferred, the aroma is rather likeable, the appearance of meat without fiber and without foreign objects. The results of the folding test are not cracked when folded 4 times and the chewiness bite test is a bit quark specific to the product.

## Conclusion

Based on literature studies obtained information that the types of kamaboko consist of *Itatsuki kamaboko*, *Fried kamaboko*, *Chikuwa* and *Hanpen*. The quality of kamaboko can be seen from organoleptic and chemical parameters. The higher the protein content and the lower the fat, the higher the quality of kamaboko. Kamaboko product development can be done with the addition of caragenan and ISP to get more chewy kamaboko products.

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