

# A REVIEW ON TRADITIONAL PACKAGING OF FISHERY PRODUCTS

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## ABSTRACT

*Traditional packaging is packaging made from natural materials which are generally used for traditional foods, and are commonly used in traditional markets using natural ingredients. The use of natural materials in traditional packaging has special elements that are not found in modern packaging elements that use artificial materials. Several types of traditional packaging materials that can be used for fishery products are wood, bamboo, rattan, banana leaves, corn husk, paper and burlap sacks. Traditional packaging that is already common uses traditional packaging derived from natural ingredients, namely pindang fish, pepes fish, otak-otak, salted fish and smoked fish and some fermented products. Pindang fish are usually packaged traditionally using leaves, paper, materials from bamboo and rattan. Pepes fish and otak-otak are packaged using banana leaves. Salted fish, smoked fish, peda and shrimp paste are generally packaged using paper packaging for the primary packaging and using bamboo, rattan or wood as the secondary packaging.*

**Keyword:** Fishery products, Natural materials, Packaging, Traditional

## 1. INTRODUCTION

Packaging is a coordinated system to prepare goods to be ready to be transported, distributed, stored, sold, and used. The existence of a container or wrapper can help prevent or reduce damage, protect the product in it, protect against the dangers of pollution and physical disturbances (friction, impact, vibration). Packaging is needed to limit food ingredients to the environment to prevent or delay the damage process so that fish products have a longer shelf life for consumption. Currently, the types of packaging that are often encountered are traditional packaging and modern packaging. Each type of packaging has advantages and disadvantages. The use or application in food products to be packaged must be adapted to the product conditions.

Traditional packaging is packaging made from natural materials which are generally used for traditional foods, and are commonly used in traditional markets using natural ingredients. The use of natural materials in traditional packaging has special elements that are not found in modern packaging elements that use artificial materials. According to [1] these elements include appearance, aroma, construction, relationship with nature or natural cycles.

Packaging culture has actually started since humans recognized the food storage system. The traditional food storage system begins with putting food ingredients into a container it finds. Developments in the post-harvest sector, there have been many innovations in the form and material for packaging fishery products. The invention of new packaging and various innovations are always put forward by producers of agricultural products, and this definitely shifts the traditional packaging methods that have existed for a long time in Indonesia.

Traditionally processed fish products in principle still use traditional and manual packaging, both using natural packaging and some already using plastic. Some products have been packaged aseptically and attractively. Products that are still packaged traditionally are usually home industry products. This traditional processed product has a wide distribution, because in general the product is relatively stable even though the preservation and packaging is very

simple [2]. Meanwhile, traditional processed fish products that have been packaged attractively are usually upper-middle-class industrial products.

Until now, the use of traditional packaging is still used by most entrepreneurs in the fields of agriculture and fisheries. This is because the raw materials are easy to obtain, easy to make, and the price is relatively cheap. The packaging provided in nature is corn husks, fruit skins, coconut husks and shells, pod shells and egg shells. In addition, you can also use the leaves as food packaging. Based on the results of research conducted by [3], banana leaves can be used as a natural casing to replace synthetic sleeves in fermented catfish sausage products. The hedonic test found that the use of natural casings (banana leaves) as an alternative packaging was favored by the panelists or this was acceptable to consumers. In addition, based on research by [4], namely the use of banana leaves in *Ilabulo* products made from catfish as raw material. The results of the study obtained hedonic quality (appearance, texture, color, aroma and taste) that can be accepted by consumers.

The condition of packaging of fishery products which is still traditional is due to the lack of knowledge of producers about packaging and the large costs that must be incurred. Of course this will affect the durability of the resulting product quality. Actually the packaging of traditional fishery products can use simple and inexpensive ingredients.

## 2. TYPE OF TRADITIONAL FISHERY PRODUCT PACKAGING MATERIALS

Traditional packaging is packaging that is available and commonly used since in traditional markets, using natural ingredients. Traditional processed fish products in general still use traditional and manual packaging, both using natural packaging and some already using plastic. Products that are still packaged in a simple way are usually home industry products. Meanwhile, traditional processed fish products that have been packaged attractively are usually medium to high-end industrial products. According to FAO terminology, traditional processed fish or "cured fish" is a product that is processed simply and is generally done on a home industrial scale. Types of processed which include traditional processed products are dried or salted dried fish, *pindang* fish, smoked fish and fermented products, namely soy sauce, *peda*, shrimp paste and the like. Some types of traditional packaging materials that can be used for fishery products are as follows.

### 2.1 Wood

Wooden planks have been used by humans for about 5,000 years and play a role in transportation, storage and packaging. Wooden packaging is used to package, transport, handle, preserve, convey and add value to several products, such as fish and other fishery products. Several studies on the hygiene side of wooden board packaging show that wood is a good material for the food industry and has bactericidal properties through physical inhibition [5].

Wooden crates are probably the oldest containers in packaging materials, because in addition to being strong, they are cheap and the materials are available in large quantities. Based on the construction, there are several types of wooden crates, including "crate" (skeleton crate), "flush side case", "battened" or "belted case" and "skid base case" [6].

Wooden packaging is usually various types of crates which are secondary packaging and are the oldest containers used by people as packaging material. Pay attention to the type of wood used: made of soft materials (*jengjeng* or *albizia* wood). Can also be from 'polywood' or 'vener'. Observe the size of the box, the location of the nails, how to tie the hoop (plate or metal plate) and how to close it. Wooden containers made from tougher materials (hardwood) are rarely used for agricultural produce. Pay attention to the wooden packaging used for salted fish, vegetables (cabbage) and fruits (apple, mango). Compare this with the wooden packaging used for dry tea. Wooden crates for tea need to be lined with a waterproof material on the inner walls. This is necessary to prevent the absorption of water from the outside or evaporation from the inside. Generally the shape of the wooden packaging is square or rectangular, this is to facilitate the arrangement of the materials or goods being packaged.

### 2.2 Bamboo and Rattan

Packaging of bamboo and rattan is a traditional packaging which is usually displayed in the form of woven. Also pay attention to whether the packaging is primary or secondary, whether paint or varnish is used to make it more attractive. The use of baskets made of woven bamboo for packaging, usually used for fruits with a smooth surface, with limited weight, or for processed products covered with leaves, paper and plastic with the aim

that the packaged product does not come out of the woven fabric, and is not contaminated by dirt and water from outside.

The advantage of packaging made of woven bamboo is that it is able to maintain air humidity, and with its opaque nature, it can protect the packaged material from decomposition reactions caused by light or light. However, the drawback is that if you are interested in the webbing it will open and it will be difficult to close it again. Fishery products packaged with rattan or bamboo include pindang fish, presto milkfish.

### 2.3 Banana Leaves

Banana leaves have been used by humans since ancient times and have a number of supporting factors as food wrappers that can protect food from damage. Banana leaves have a wide and long cross section and do not have harmful sap, making them suitable as food packaging. Banana leaves are non-porous so food doesn't get wet and doesn't tear easily after heating.

Banana leaves are often used in traditional packaging because of their wide size, soft, limp, and not easily crushed when steamed or baked. Judging from its content, banana leaves contain polyphenols, mostly in the form of EGGG (Epi Gallo Catechin Gallat) which plays a role in producing a distinctive aroma. The polyphenol content in the leaves can inhibit the growth of *Streptococcus* bacteria [7]. Banana leaves are also relatively easy to clean, just wipe the surface with a cloth and various foods can be wrapped with it without the need to add a coating [8]. However, leaves as organic material also have properties that need to be considered, namely the presence of natural contaminants in the leaves, so that when used as packaging it can affect the quality of the food it packs. In an experiment packaging can affect the quality of the packaged food. In a food packaging experiment, it was found that the number of bacteria in food packaged with banana leaves on the first day reached  $1.1 \times 10^4$  to  $2.2 \times 10^5$  cfu/g and molds from 20 to 60 per g. The types of bacteria that are often present on the leaf surface are *Bacillus cereus*, *B. Subtilis*, *Lactobacillus acidophilus*, *Staphylococcus aureus*, *S. epidermidis*, *Pseudomonas* sp., *Corynebacterium* sp., *Micrococcus* sp. The most common molds are *Mucor mucedo*, *Aspergillus niger*, *A. flavus*, *Penicillium expansum*, *Rhizopus stolonifer* [8].

Based on the results of research conducted by [3], banana leaves can be used as a natural casing to replace synthetic sleeves in fermented catfish sausage products. The hedonic test found that the use of natural casings (banana leaves) as an alternative packaging was favored by the panelists or this was acceptable to consumer. In addition, based on research by [4], namely the use of banana leaves in Ilabulo products made from catfish as raw material. The results of the study obtained hedonic quality (appearance, texture, color, aroma and taste) that can be accepted by consumers.

### 2.4 Corn Husk

Corn husk has long been used by the Indonesian people and, in general, is often found in traditional markets. One type of husk is corn husks. According to [9], corn husks are corn husks left over from harvest which are directly dried using sunlight. Sun lighting is sometimes carried out in the fields, thereby increasing the potential for dust or microbial contamination of corn husks. This can affect the condition of the product in the corn husk packaging.

From the corn harvest, the weight of corn husks ranged from 38.38%. So far, corn husks in Indonesia are widely used as animal feed, traditional food wrappers, and traditional crafts. The use of corn husks as mentioned above has not been effective in maximizing the potential of corn husks waste, so further research is needed to maximize corn husks waste. The development of corn husks as ordinary bio plastics is one solution to maximize the use of corn husks. This is based on corn husks having high fiber content ranging from 38%-50% and carbohydrate content ranging from 38%-55% [10].

### 2.5 Paper

Paper as a packaging material is widely used and will still maintain its position for a long period of time because it is cheap, easy to obtain and widely used. The packaging properties of paper vary greatly depending on the manufacturing process and the additional treatment provided. The strength and mechanical properties of paper depend on the mechanical treatment of the cellulose fibers and on the application of fillers and binders. The physicochemical properties of paper, such as permeability to liquids, vapors and gases, can be modified by saturation or "laminating". Materials used for this purpose include waxes, plastics, resins, gums, adhesives, asphalt and other materials. Paper can be used as a flexible packaging material or as a material to form rigid paper

containers [11]. There are two main types of paper used, namely rough paper and soft paper. All paper used for packaging is classified as rough paper. Fine paper used as bond writing paper, ledger and cover paper. The most widely used paper for packaging is what we know as craft paper with natural colors. Types of packaging made from paper:

- **Folding Carton**  
Is a type of packaging that is popular because of its practical nature and the cheapest price, easy to fold so it only takes up less space in transportation and storage. Likewise in printing, it can be done to improve the appearance of the product. The wide use of this type of packaging is due to the many variations in terms of models, shapes and sizes with special characteristics. For packaging quality testing, it can be done starting with simple tests to more detailed ones. For example, a drop test for a filled container, a bulge test, a compression strength test, and a stiffness test related to air humidity.
- **Cardboard (Setup Boxes)**  
Cardboard actually resembles a folding cardboard box, especially when viewed from the existing forms. However, this type of cardboard packaging has advantages in its use. Cardboard material is cardboard, often laminated by white paper. There are parts to mold stable packaged goods. These parts can be assembled according to their use. Fragile items can be packaged stably.
- **Wrinkle Cardboard**  
Other names for corrugated cardboard are corrugated cardboard and flow cardboard. Corrugated cardboard is formed by gluing flat sheets to corrugated sections. If only one flat sheet is glued together, it is called single-faced corrugated cardboard, whereas if two sheets are glued together on a corrugated cardboard, it is called double-faced corrugated cardboard. Furthermore, the names of double walls and triple walls are known which may be given an additional layer. There is a part in the corrugated cardboard packaging that can be installed in various forms for types of security to prevent damage to the packaged product. Packages made of wood are used extensively for shipping and storing prepackaged foods. Wooden packaging is rarely used as a food container directly.

### **3. FACTORS AFFECTING THE WORK OF PACKAGING TRADITIONAL FISHERY PRODUCTS**

Natural packaging materials used to contain food include bamboo reeds, leaves, midrib or tree bark, animal skins, tree trunk cavities, stones, clay, bones and so on. This is done so that the quality of fishery products can be maintained both in terms of taste and shape from microorganisms that can enter the product if the product is not packaged. According to [12], food damage can be caused by two things, namely damage by the natural nature of the product that takes place spontaneously, and the second is damage due to environmental influences. Therefore, it is necessary for packaging to limit food ingredients to the environment to prevent or delay the damage process so that the fishery products can still be well received by consumers.

The most important properties of the packaging include gas and water vapor permeability and the surface area of the packaging. Packaging with good gas resistance and smaller surface area causes the product to have a longer shelf life [13]. With the traditional packaging materials, it is hoped that fishery products can have a long shelf life. The factors that affect the work of packaging traditional fishery products are water content, humidity, air temperature, and the physical and chemical conditions of fish [14]. Water content can affect fishery products, because the uneven distribution or propagation of heat during the process of making traditional fishery products can be affected by environmental conditions such as ambient air temperature and humidity. [12] explain that the water content during storage is strongly influenced by the relative humidity of the air around the material, so that the higher the water content in a traditional fishery product, the durability of the product will decrease because traditional fishery product packaging is often found in the product. Generally still have gaps for air from outside to enter so that it affects the quality of the product later.

According to [11], the durability of packaged foodstuffs is influenced by:

- The nature of the food material and the mechanism by which the material is damaged, for example its sensitivity to moisture and oxygen, the possibility of physical and chemical changes in the food
- The size of the packaging material in relation to its volume
- Atmospheric conditions (especially temperature and humidity) of packaging are required to protect during transport and before use
- Overall resistance of packaging materials to water, atmospheric gases and odors, including resistance to caps, covers and folds.

## **4. THE APPLICATIONS OF TRADITIONAL PACKAGING ON FISHERY PRODUCTS**

### **4.1 Pindang Fish**

Pindang fish is one of the traditional ways of processing fresh fish with a combination of salting and boiling. Transfers can be grouped by process, container used, treatment and type of fish. Among the types of pindang include pindang milkfish, pindang mackarel tuna, pindang decapterus, pindang skipjack, pindang Java barb, pindang gourami and so on [15]. Pindang fish are usually packaged traditionally using leaves, paper, materials from bamboo and rattan.

Pindang fish are packaged in baskets or cardboard boxes that are lined and covered with oil paper. With this packaging model, pindang fish will be protected from physical damage and contamination from outside dirt during transportation. Packaging should be done after the pindang fish has cooled properly. If it's not cold yet, condensation will occur and the pindang fish will be damaged quickly and easily overgrown with fungus.

Bamboo and rattan are also used as materials for packaging fish pindang. Bamboo packaging is often known as basket or tenggok in Javanese. Woven from bamboo tends to be stronger than leaves that are disposable. We can now find woven packaging in traditional markets that take advantage of the strength of the woven as a place to store their wares.

### **4.2 Pepes Fish**

Pepes fish is a food made from fish that is given spices or seasonings, wrapped in banana leaves and then baked or steamed (pais or palai). All types of fish can be processed in this way including carp, catfish, corm, catfish, carp, eel, and so on.

The packaging technique commonly used for traditional packaging of fishery products is usually done by wrapping and rolling the fish in banana leaves and then attaching the ends of the rolled up leaves with sticks or folding them. In addition to the rolling technique, the tum folding technique is used to wrap processed fish such as anchovies or fish tubers. Tum is made with square banana leaves with two ends folded up and a stick attached.

### **4.3 Fish Otak-otak and Sausages**

Fish otak-otak are processed fishery products that use minced fish meat or surimi of at least 30% mixed with flour and other ingredients, with or without vegetables and coconut milk that have been formed, with or without wrapped in leaves and cooked [16]. Catfish fermented sausage can be packaged using banana leaves as a natural casing to replace synthetic casings [3].

### **4.4 Salted and Smoked Fish**

Salted fish is fish that has been preserved by salting, while smoked fish is fish that has been preserved by smoking. Salted fish and smoked fish usually use paper packaging for their primary packaging and use bamboo or rattan as the outer packaging of salted fish and smoked fish products. Woven bamboo is used to protect the product from external contamination and damage during transportation.

### **4.5 Fermentation Products**

Fermented products from fishery products include peda and shrimp paste. Peda is a fermented product with fish as raw material, which is processed by salt fermentation. The type of fish that is often used as raw material for peda is mackerel, this is because the type of mackerel produces peda fish which has a distinctive taste and aroma and is better than other types of fish. Shrimp paste (terasi) is one of the fermented products of fish or shrimp that only undergoes salting treatment (without being followed by the addition of acid), then left for a while for the fermentation process to occur [17]. The packaging used for peda and shrimp paste is generally paper as the primary packaging and uses bamboo, rattan or wood as the secondary packaging.

## **5. CONCLUSIONS**

Traditional packaging is packaging made from natural materials which are generally used for traditional foods, and are commonly used in traditional markets using natural ingredients. The use of traditional packaging is still used by most entrepreneurs in the agriculture and fisheries sector, because the raw materials are easy to obtain, easy to make, and the price is relatively cheap. Several studies have also proven that traditional packaging derived from nature can affect the hedonic quality of the product. Traditional packaging techniques that are often encountered are using leaves, bamboo, and rattan. Packaging using leaves is rolled, folded, and woven. Packaging using bamboo and rattan is generally used in the form of woven. Types of fish that are packaged traditionally, for example, are pindang and pepes fish, salted fish, smoked fish, otak-otak and some fermented products.

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