



Banana Leaves as A Natural Food Packaging : A Review

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Abstract

Banana Leaves is one of the most used material for natural food packaging with its natural properties of foldable structure and its ability to hold water. In modern food industry, its usage mostly has been ceased and replaced by plastic and other synthetic material. This paper aimed to provide a literature review about banana leaves as natural food packaging and its effect on the food product. Research state that banana leaves is also known to be used as a natural packaging with antioxidant, antibacterial, and organoleptically pleasing.

Introduction

Usage of natural material as packaging in general often become prized culture and heritage along with its food product. The types of leaves commonly found as food wrappers in Indonesia are banana leaves, coconut leaves, corn sheath, palm leaves, guava leaves, water guava leaves, teak leaves, simpur leaves, and other leaves (Maflahah 2012).

Indonesia is a tropical country with diverse vegetation. From there, various kind of leaves produced and used as food packaging such as banana leaves, teak leaves, corn leaves, etc. Leaves packaging is unique, artistic, and add flavour to the product. Banana (*Musa spp.*) belonging to family Musaccae is major tropical and subtropical fruit that has been cultivated for many decades and its leaves is one of many material of natural food packaging. Its water holding quality make it able to accommodate thick soupy dish caused by hydrophobic nature of its waxy substance coating (Ramadhan *et al.* 2020).

As time goes by, leaf packaging started to being replaced by the emergence of synthetic packaging such as plastic, cardboard boxes, Styrofoam, ect. And people rarely using it because it is considered impractical, unsafe, and not durable. Apart from that, many people still using banana leaves for food packaging since it has its own characteristics that cannot be compared if its wrapped in synthetic packaging.

Banana Leaves Packaging

The usage of banana leaves are often found in the traditional market for traditional food and cakes such as *Arem-arem*, *Lontong*, *Lemper*, *Nagasari*, *Kopyor*, etc. its also sometimes seen in your daily food stall and restaurant for take-home order. In modern food industry banana leaves are often used as alternative to modern synthetic packaging on daily food in Indonesia. However, there is a certain limitation to that statement as some Indonesian traditional food rely on its natural food packaging.



Figure 1. *Nagasari* (left) and *Lemper* (right)

Just like peanuts with its skin, some foods comes with its packaging and cannot be made without it. *Ba Chang/Bakcang/Zongzi* is a meat dumpling where the leaves are ‘treated’ or boiled before it is used for wrapping. The wrapping is so important that record said they had 57 documented leaves type just for it (Lin *et al.* 2019). The other food, like *Ketupat* and *Lemang* also need an obligatory packaging for both of them are made for *Ied* ceremony.



Figure 2. *Ketupat* (Left) and *Lemang* (Right)

Food packaging materials serve to extend the shelf life of food and protect it mechanically from chemical and biological contaminants. One of the safest food wrapping materials to use is natural ingredients such as leaves. The reasons leaves are a good natural packaging material is they have a positive impact on the environment and consumers because they do not contain harmful chemicals, can be found easily, can be formed easily and give a delicious aroma to food (Astuti, 2009).

Natural packaging material sometimes proven to be cheaper. Study results are known from the research of Lestari *et al.* (2016) that the production cost of the *Tempeh* home industry in Purworejo Regency for plastic packaging is an average of IDR 1,298,080.00. Meanwhile, the production cost of the home industry for tempeh in banana leaf packaging is an average of Rp. 1,209,265.67.

For a by-product that comes with banana production, banana leaves is an attractive alternatives for plastics that has a 0-cost. Banana leaves also eco-friendly and biodegradable and also easily be bend and twist to make a good stylist natural packaging.

Banana Leaves Attribute

Rahmadhia & Juwitningtyas (2020) research stated that the leaves of *Klutuk banana* leaf of *susu* and *wulung* is good as food packaging material as their sampel of third leaf stalk (petiole) based on its mechanical properties, color, and antioxidant activity. The highest antioxidant activity is found in the first leaf bud (shoot) of *Klutuk banana* leaves of *susu* and *wulung* cultivars.

In food industry banana leaves also revealed to have a special property for fermentation as *Dangke Cheese* that was packaged by banana leaves reduced microbial contamination than the plastic material (Zakariah *et al.* 2019).

Table 1. Microbacterial Evaluation of Dangke Cheese

Substrate	Most probable number (MPN) Coliform	Most probable number (MPN) E. coli
<i>Fresh dangke</i>	11 MPN/g	11 MPN/g
<i>Dangke by packaging plastic</i>	2.4x10 ⁹ MPN/g	3 MPN/g
<i>Dangke by packaging banana leaf</i>	2 x 10 ⁹ MPN/g	3 MPN/g

In a research about organoleptic properties, banana leaves packaging revealed to provide organoleptic properties especially in terms of aroma, color, taste and texture on fermented cassava or *Tape* with the others sampel being plastic packaging and jar packaging (Hidayah & Basiran, 2021).

Table 2. The results of the research on organoleptic properties of cassava tape with different packaging.

Handling	Mean				
	Aroma	Color	Taste	Sweetness	Texture
Plastic	1.91a	1.64a	1.77a	2.77a	2.73a

Banana Leaves	1.05b	1.32a	1.09b	1.32b	1.73b
Jar	3.82c	2.27b	3.50c	3.77c	4.09c

Conclusion

Banana Leaves is relatively cheap, ubiquitous, and biodegradable. Banana leaves is also known to be used as a natural packaging with antioxidant, antibacterial, and organoleptically pleasing which is why it is one of the most used leaves packaging.

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