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Mini Review

Mangrove and Its Health Benefits

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Introduction

Mangrove, which in Indonesian is known as mangrove, is one of the many vegetations found on bays of shallow coasts, estuaries, deltas and protected coastal areas that are still affected by tides in Indonesia. This plant has striking features, with large and woody supporting roots, shoots in the form of tapered foliage leaves, and fruits that germinate and root while still in the tree. Mangroves provide various benefits, the wood is used as fuel and charcoal, tannins from the bark are used as dye, and are sometimes used as medicine in cases of hematuria (presence of blood in urine). Mangroves are also planted along the ponds to protect the embankments [1].

Based on the type of compound, waste can be categorized into two parts, namely organic waste and inorganic waste. Organic waste is a group of waste which consists of the constituent parts of plants and animals. Organic waste can be used to increase soil fertility, because organic matter can be decomposed by microbes which then become beneficial nutrients for plant growth. Today mangrove fruit can be used as food, for example mangrove crackers, mangrove syrup, mangrove pudding, and mangrove klepon, as presented in Figure 1. Furthermore, organic waste such as mangrove waste can be processed into natural fabric dye.

Figure 1: Mangrove fruit which can be processed into crackers.

Pigment of mangrove waste for hypoallergenic natural batik dye

The use of mangrove waste as a natural dye pigment of batik is more environmentally friendly because the waste produced will not damage the land and sea environment and is more easily decomposed. In addition, the mangrove waste used is obtained directly from nature by taking fallen bark and leaves, at no cost at all because the principle used is to recycle organic "waste". Research found 6 species of mangroves that can be used as natural fabric dyes, namely *Sorenasia alba*, *Rhizophora sp*, *Avecenia sp*, *Ceriops decandra*, *Lunicera sp* each leaf and stem are used, except *C. decandra*, which is only used for leaves. The mangrove species *Lunicera sp* only uses lotus fixer solution on leaves and stems, while combined fixers are also used as treatment for processing *Lunicera sp* leaves [2].

The color produced by each type of mangrove

Retention of fabric dyes from mangrove waste has not been widely studied and applied to batik cloth. The mangrove species of *Rizhophora mucronata*, which can produce light brown to maroon colors, has the potential to be applied as a unique fabric

dye from this type of mangrove. The color content can be an asset that when utilized properly will be economically beneficial for the surrounding community. Phytochemical test results on the leaves and bark of mangrove trees showed a strong positive result on the tannin group with dark green color, while the mangrove bark showed positive results on the quinone with red orange color. The application of mangrove-based fabric dye pigments on batik is a different method than other batik production methods, because the basic ingredients of the dye are made from natural ingredients that are hypoallergenic [3].

Observation with a UV-VIS spectrophotometer on pigments in leaves and mangrove bark waste shows the presence of chlorophyll a and b. Mangrove leaves show the presence of chlorophyll a pigment, while mangrove bark waste has chlorophyll b pigment content [4]. The quality of fabric dyes used in batik cloth depends on the type of pigment used.

Bioactivators from Mangrove Waste

Leaves and twigs from mangrove trees that live on the coast and coastal estuary will in time fall and rot into mangrove litter which will then be decomposed by microbes into nutrients that are very beneficial for plant growth. This is an indication that symbiont microbes from mangrove litter act as decomposers and fertilizers of plants. Based on these findings, a study was conducted to determine the function of bioactivators from mangrove waste. The results of the study of mangrove waste symbiont microbes found 16 microbial isolates. Colony properties in bacterial isolates found were categorized by color, shape, texture and margin. The isolate of *R. mucronata* symbiont microbe, based on its color, shape and texture, is dominated by white, circular shape with convex texture. Of the 16 isolates, 4 isolates were determined as selected isolates.

Microbial symbiont of mangrove identified as potential bioactivator solutions. The four types of microbes appear to work synchronically, so these microbes have the potential to be used in a microbial consortium. From the results of molecular identification of symbiont microbe of mangrove litter, it was determined that the four species were *Pseudomonas sp*., *Flavobacterium sp*., *Acinetobacter sp*., and *Bacillus subtilis* [5]. A bioactivator product named Reuse has been used by the community in Tembalang District.

Conclusion

It was concluded that mangroves are beneficial for health and have economic value.

Acknowledgement

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Conflict of Interest

No conflict of interest.

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