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Dukang fish (*Bagroides melapterus*) mucus as a traditional medicine for the community of the Pegagan Ilir ethnic, Ogan Ilir Regency, South Sumatra Province, Indonesia

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Abstract

Some fish have scaly bodies and some do not. Scales on fish serve to protect the fish from parasitic infections. The fishes without scales and mucus serve to protect fish from parasitic infections. The fish mucus is antibacterial. The dukang fish (*Bagroides melapterus*) is one of the endemic species of Indonesia. This species has no scales. The dukang fish produce more mucus than some other freshwater species. The use of dukang fish mucus as a wound medicine has long been carried out by the Pegagan Ilir ethnic. This article reviews the use of dukang fish by the Pegagan Ilir ethnic as a traditional medicine for wound healing and its bio-ecology and economy.

Keywords: *Bagroides melapterus*; Dukang fish; Fish mucus; Traditional medicine

1. Introduction

The province of South Sumatra, Indonesia is known as Negeri Batanghari Sembilan because the province consists of nine major rivers. The names of the districts within the province are taken from the names of the rivers that are included in their administrative area. One of them is Ogan Ilir Regency. The name Ogan Ilir Regency is taken from the name of the main river in this region, namely the Ogan River downstream (Ilir). Geographically, Ogan Ilir Regency has located at 3,002'-3,048' latitude and 104,020-104,048' east longitude with an area of 2,666.07 km^2. The district's capital is Indralaya. The original inhabitants of Ogan Ilir Regency come from the Pegagan and Penesak tribes. The Pegagan and Penesak are the names of rivers and tributaries of the Ogan River in the region. The Pegagan tribe is divided into two, namely Pegagan Ilir and Pegagan Ulu. Residents of the Pegagan Ilir tribe, living on the banks of the Pegagan River, the Ogan River, and the downstream Kelekar River (Ilir). Several villages belonging to the Pegagan Ilir tribe, including Muara Penimbung Ulu Village and Muara Penimbung Ilir Village, Indralaya District, and Sukamerindu Village, Muara Kamal, Talang Pangeran Ilir, and Talang Pangeran Ulu, Pemulutan Barat District. The topography of the land in the Pegagan Ilir area is in the form of large rivers, tributaries, and flooded swamps known as Lebak Lebung. Fish production in Ogan Ilir Regency comes from Lebak Lebung. The diversity of fish species in the Lebak Lebung area is very high [1], one of which is the Dukang fish (*Bagroides melapterus*). Management of fishery resources in the Lebak Lebung area is carried out using an auction system. This tradition has been carried out since the Dutch colonial government.

The main livelihoods of the Pegagan Ilir community are farming lebak swamp rice fields and as fishermen, both as fishermen who want to auction lebak lebung and as a freelance fishermen. Pengmin is a person who has management rights over lebak lebung because he has won in the lebak lebung auction [1]. The community's economy still relies on

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the use of natural resources in the form of lowland swamps and swamps and rivers. To meet the needs of life, residents try to fulfill themselves. One of the ways the people of this tribe meet their daily needs is by using the Dukang fish (*B. melapterus*) as side dishes and its mucus as wound medicine.

2. Utilization of Dukang Fish Mucus

The use of Dukang fish mucus as a wound medicine has long been carried out by the Pegagan Ilir ethnic, especially the residents of Muara Kamal Village, Pemulutan Barat District, and Muara Penimbung Village, Indralaya District. In ancient times, people were not familiar with modern wound medicine. The residents used natural resources around them, for example plants and animals that contain medicinal chemicals, one of which is the mucus of Dukang fish.

According to local community stories that have been passed down from generation to generation, local knowledge shows that the mucus of the dukang fish can treat wounds, starting from the fisherman who was installing the skeleton of the lulung pond when he was injured by a machete while working. Empang Lulung is one type of traditional fishing gear in the Pegagan Ilir Tribe. At the same time as the incident, another fisherman was catching fish and caught some Dukang fish. The fisherman helped the injured fisherman by smearing the mucus of the Dukang fish on the wound. The blood stops coming out, the patient feels pain in the wound that is smeared with mucus, and it doesn't take long for the wound to dry and within a few days the wound will heal. The story of the success of healing wounds with fish slime spread to the community. If there are residents who are injured, other residents immediately help look for the Dukang fish and take the mucus to be smeared on the injured body parts. This experience occurs continuously, from generation to generation. Until now, there are still many people, especially fishermen, who use the mucus of Dukang fish to treat wounds, especially wounds caused by sharp objects.

3. Dukang Fish Mucus

The fish consist of scaly fish and fish without scales. Fish scales are part of the integumentary system. This system serves as a means of defense of the body against parasitic attacks. This system consists of the skin and its derivatives. Mucous glands are one of the derivatives of the integumentary system. Mucous glands function to produce mucus. Fish that do not have scales, produce more mucus than fish with scales. Fish mucus layers are the main surface of exchange between fish and the environment, and they possess important biological and ecological functions [2].

Fish that do not have scales include lais fish (*Genus Kriptopterus*, *Belodontichys. Ompok*), catfish (*Genus Clarias*), Pangas catfish (*Genus Pangasius*), Asian redtail catfish (*Genus Mystus, Hemibagrus, Bagroides*), eels (*Genus Monopterus*). Dukang fish (*Genus Bagroides*) is one type of fish that does not have scales. The scales on fish serve as body protection from parasites. For groups of fish that do not have scales, self-defense against parasitic attacks is done by producing mucus. Likewise other fish that do not have scales, such as catfish (*Clarias gariepinus, C. batrachus, C. Clarias niuehofii*), Pangas catfish (*Pangasius djambal, P. micronema. P. polyuranodon*), Asian redtail catfish (*Mystus negriceps , M. nemerus, M. planiceps*), lais catfish (*Kriptopterus palembangensis, K. lais, K. apogon*), rice swampeel (*Monopterus albus*) and others.

The characteristics of fish mucus vary between species. The amount of mucus produced, the color, smell, thickness, and stickiness, of each species are different. In general, fish mucus contains a substance called mucin, which is a type of glycoprotein. The protein molecules in mucin are attached to many carbohydrate molecules. The main characteristic of mucin is its ability to form a gel, therefore mucin is a key component in most gel-like secretions, functioning lubrication, and cell signaling to form chemical barriers. Mucin acts as an inhibitor, binding to pathogens as part of the immune system. In addition, fish slime mucin also contains enzymes, antibodies, amino acids, and minerals. Fish mucus also contains antimicrobial compounds, including Claricin and Hepcidin.

Dukang fish mucus is different from other types of fish without scales. Based on field observations, the mucus of the Dukang fish was more than that of the African catfish (*Clarias gariepinus*), Asian redtail catfish (*Mystus nemerus*), rice swampeel (*Monopterus albus*) and murrel snakehead (*Channa striata*). The mucus of the fishes is clear, watery, and not sticky, has a strong fishy smell, and is in small amounts. Dukang fish mucus is yellow, thick, and sticky, does not have a strong fishy smell, and is in large quantities. Dukang fish mucus can be collected by scraping the entire body surface of the Dukang fish with a knife as shown in Figure 1.

Fish mucus contains anti-microbial compounds. This compound serves to protect the injured skin tissue from microbial attack so that the injured skin tissue is protected. The content of glycoproteins in mucus can help the cell regeneration process so that dead skin cells due to injury can be replaced with new cells. Thus, fish mucus can be used as a wound medicine. The use of Dukang fish mucus by residents of the Pegagan Ilir ethnic, Ogan Ilir Regency, and South Sumatra

has proven to be able to treat wounds. How to use it is very easy, namely take the mucus of the Dukang fish using a knife as shown in Figure 1 above, then apply it to the injured body part and let it sit until the mucus is dry on the surface of the wound.

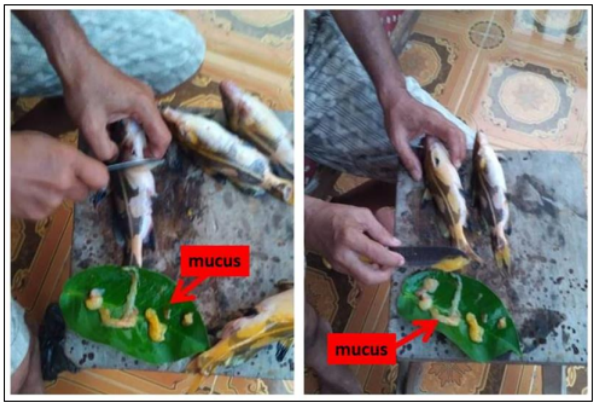

Figure 1 The mucus of the Dukang fish (*Bagroides melapterus*)

Antibacterial activity in fish mucus has been demonstrated in several fish species [3]; yet this activity seems to vary from species to species such as tilapia *Tilapia hornorum* [4], snakehead fish *Channa striatus* [5], rainbow trout *Oncorhynchus mykiss* [6], Channa *punctatus* and *Cirrhinus mrigala* [7], rockfish *Sebastes schlegelii* [8], and can be specific towards certain bacteria [9].

4. Dukang Fish Bio-Ecology-Economy

Taxonomically, Dukang fish include phylum Chordata, class Teleostei, order Siluriformes, family Bagridae, genus *Bagroides*, and species *Bagroides melapterus* Bleeker, 1851 [10]. This fish is closely related to the Asian redtail catfish (*Mystus numerus*). Dukang fish is a type of freshwater fish native and endemic to Indonesia. This fish is found in Sumatra and Kalimantan. In Sumatra, this fish is found in South Sumatra, Jambi, Lampung, and Riau. In South Sumatra, this fish is commonly found in the central part of the Lebak Lebung Watershed, the lower part of the Lematang watershed, and the lower part of the Ogan watershed. The characteristics of the habitat of this fish are rivers connected to flooded swamps, slow water currents, lots of vegetation on the banks of the river, and muddy bottom of the waters [11].

Dukang fish's body shape is elongated. The body is yellow and black. Has no scales. It has dorsal, pectoral, pelvic, anal, and caudal fins. The dorsal and pectoral fins develop hard jury into Patil. The thorns are very sharp and jagged. On the back of the back, there is a fat fin (adipose fin). The morphology of the Dukang fish is shown in Figure 2. The weight of this fish can reach 2 kg per fish.

Figure 2 The morphology of Dukang fish (*Bagroides melapterus*)

This fish is omnivorous. Types of food can be in the form of aquatic insects, worms, fish/shrimp chicks, rotting water plant litter, moss and others. This fish reproduces by laying eggs. This fish is caught in nature by using ponds, nets, fishing rods, fishing rods, and nets. This fish is very popular with the public, because of the delicious taste of the meat, the texture of the meat is soft, the meat does not contain fine spines, does not have scales, and the fishy smell is not too

strong. This fish can be processed into a variety of dishes, including pindang pegagan, pindang tempoyak, brengkes, fried, and grilled. The pindang pegagan is one of the typical dishes of Ogan Ilir Regency. In addition to being consumed in fresh form, this fish is often preserved by a smoking process to become salai dukang fish. The price of this fish is quite expensive compared to other types of freshwater fish. Fresh live/dead Dukang fish weighing less than 500 grams per head costs IDR 30,000-50,000 per kg, fish weighing more than 500 grams per head costs IDR 80,000-100,000 per kg. The price of Dukang salai ranges from IDR 120,000 to IDR150, 000 per kg. The body shape and color of the Dukang fish are very attractive, their behavior is docile and adaptive in the aquarium. Generally, small-size Dukang fish (Length > 10 cm), are kept as ornamental fish. The price of ornamental fish reaches IDR 10,000-20,000 per head. Dukang fish is very prospectively cultivated [1]. These fish are used as side dishes, ornamental fish (aquarium pets), and their mucus as medicinal uses.

5. Conclusion

Dukang fish (*B. melapterus*) mucus is yellow, thick, and sticky, does not have a strong fishy odor, and is more abundant than African catfish (*Clarias gariepinus*), Asian redtail catfish (*Mystus nemerus*), rice swampeel (*Monopterus albus*) and murrel snakehead (*Channa striata*). The Pegagan Ilir ethnic, Ogan Ilir Regency, South Sumatra has long used the mucus of Dukang fish to treat wounds and it has been proven that wounds can heal. Research on the analysis of bioactive compounds contained in the mucus of the Dukang fish and the domestication of Dukang is very necessary.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

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