

Epidermal mucus from Nile Tilapia (*Oreochromis niloticus* Linnaeus, 1758)

Rehana Raj^{1*}, Reshma C.N.², Asha K.K.² and Suseela Mathew²

¹Mumbai Research Centre of ICAR-CIFT, Navi Mumbai, Maharashtra-03

²ICAR-CIFT, Matsyapuri, Cochin, Kerala, 682025

* rehanaraj9@gmail.com

Fish are known for their ectothermic adaptation which regulates their body temperature with respect to the environment. Fish can change their body temperature in accordance with the change in temperature of the water surrounding them. They intake oxygen from water using gills or employ accessory organs to inhale atmospheric oxygen. Fish encounters several pathogenic organisms from its surrounding water body. Hence they possess several defence mechanisms to defend themselves. Skin mucus present on its body plays a major role as a primary defence barrier against pathogenic infection. The mucus is present as an incessant lining, covering its body and body openings, also covering the fins. It is known that the antimicrobial agents present in the fish mucus help in the defence mechanism. Mucus on the fish body always coexist with the scales where in it completely controls the movement of the water into and out of the body. It helps to reduce the drag while the fish swims. Consequently, aids in maintaining a stable atmosphere inside the fish. Mucus contain several compounds such as transferin, creatine protein, lysozyme and antimicrobial proteins etc which are having specific functions. The antimicrobial property exhibited by fish mucus is due to the shielding property of the peptides against pathogens. Production of mucus is stirred by various factors, including microbial exposure, stress, water temperature, pH. It varies between the species, and the rate of microbial incidents. This can in turn effect the mucus production, level of proteins and immune molecules present in the mucus.

Studies on fish mucus have improved over the years and had led to the discovery of various bioactive compounds. These bioactive compounds have a variety of applications in human medicine and aquaculture - related activities. The extraction and characterization of immunity-associated molecules and AMPs have been carried out from fish mucus. Also, the studies pertaining to the fish mucus and their ecological role in the environment were also reported. Hence, the study on mucus aids in the primary detection of infections and examines the contact of environmental pollutants on probe health. This communication reports on the biochemical properties of fish mucus from the farm-reared Nile Tilapia.

The live tilapia were collected directly from a nearby farm. Mucus collection was carried out in accordance with Chong *et al.* (2005) & Ebran *et al.* (1999), with minor modifications. Briefly, skin mucus was collected through gentle scrapping of the dorsal-lateral part of the body of the fish using clean glass slides into the clean and sterilized petri plates. This stimulated the fish to create fresh mucus layer which was further collected. The mucus was not collected from the ventral portion in order to avoid intestinal and spermal contamination. The mucus thus collected was centrifuged at 13,000 x g for 20 min at 4°C. The resultant supernatant was collected, freeze-dried immediately and stored until further analysis.



Fig.1 Collection of mucus from Nile tilapia

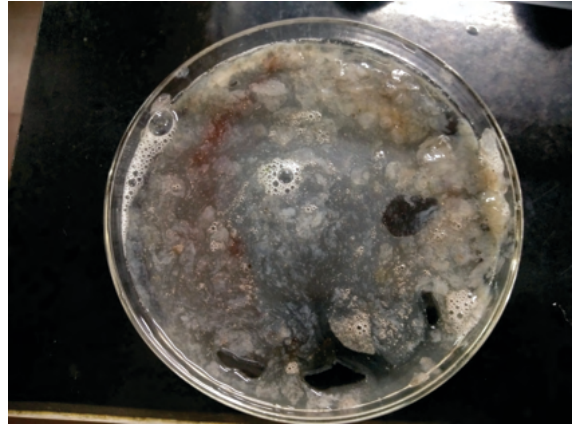


Fig.2 Extracted mucus

The biochemical characterisation revealed the presence of protein (206.31 ± 1.16 ug/ml), carbohydrates (49.65 ± 0.86 ug/ml) and lipids

(3.4 ± 0.23 mg/ml). Further characterization is in progress.

Protein (μ g/ml)	206.31 ± 1.16
Carbohydrates (μ g/ml)	49.65 ± 0.86
Lipids (mg/ml)	3.4 ± 0.23

References:

- Chong, K., Ying, T. S., Foo, J., Jin, L. T., & Chong, A. (2005). Characterisation of proteins in epidermal mucus of discus fish (*Symphysodon spp.*) during parental phase. *Aquaculture*, 249(1-4), 469-476.
- Ebran, N., Julien, S., Orange, N., Saglio, P., Lemaitre, C., & Molle, G. (1999). Pore-forming properties and antibacterial activity of proteins extracted from epidermal mucus of fish. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology*, 122(2), 181-189.