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A Comparative Study of Anti Bacterial Activity of Epidermal Secretion of Two Fishes *Channa punctatus* and *H.fossils* (Bloch)

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Abstract:- The present study carried out to determine the comparative study of antibacterial activity of epidermal secreations of two fishes *channa punctatus* and *Hetetropneustes fossilis*, against bacterial strains. i.e *Escherchia coli, Klebsiella pneumonia, Staphylococcus aereus, Proteus vulgaris.* In Channa punctatus higest Zone of inhibition occurs with *Staphylococcus aureus* (30mm) and minimum ZOI occurs with *Klebsiella pneumoniae* (19mm) . In *heteropneustes fossilis* the higest Zone of inhibition occurs *Escherchia coli* (30mm)., minimum ZOI with *Klebsiella pneumonia* (20mm) . The antibacterial activity of epidermal mucus secretion was compared between two fishes *channa punctatus* and *Hetetropneustes fossilis* .

Keywords:- *Antibacterial, fish mucus, Channa punctatus, Hateropneustes fossilis Epidermal mucus Pathogen, Zone of inhibition.*

I. INTRODUCTION

Fish lives in microbe-rich environment and are vulnerable to invasion by pathogenic (or) opportunistic microorganisms. Fishes which directly come into contact with high concentrations of pathogens in their aquatic environment leads to the problems of infectious diseases (Loganatahan, 2013**).** Mucus substance is secreted from epidermal cells and it's a biological interface between fish and its environment consisting of potentially rich proteins, minerals, enzymes, pigments, inorganic salts, immune globulins (Whyte 2007). Based on some reports fish mucus possesses wound healing, ant nociceptive, platelet aggregation, anti inflammatory, anti fungal, anti bacterial properties. The distribution of lysozyme, proteases and alkaline phosphatase and their role in defense have been reported from a review mucus secretion of viz., Coho Salmon, Rainbow truot, arcitic char, Brook trout, Koi carp, Striped bass, Haddock, Atlantic cod and Hag fish (Fast *et al*., 2002, Subramanian 2007, Palaksha 2008). Zootherapy is the alternative to the healing of diseases by using therapeutics derived from animals (Anil. Tyor 2016; Haniffa 2014). According to WHO 8.7 % of medicines are prepared from animals, out of 252 traditional medicines (Marques 1997). In the past thirty years many new antibiotics have been produced by pharmacological industries, but micro-organisms developed resistance to these drugs due to multi drug resistance efficiency of micro-organisms. So it is necessary to search for new antimicrobial agents to overcome infections and side effects. In view of the above context we have also investigated the efficiency of antimicrobial properties of skin mucus of *H. fossilis.*

II. METHODOLOGY

Live fishes (Channa punctatus and *H. fossilis*) weighing about 50 ± 10g of approximately were procured from local pond Nagaram Village, Warangal District, Telangana, The fishes were acclimatized to laboratory conditions in bore well water and they were maintained for 5days. After 5 days these fishes were used for mucus collection.

A. Collection of mucus from fish

Mucus was carefully collected from the dorsal side of the body using a sterile spatula. Mucus was not collected from the ventral side to avoid intestinal and sperm contamination. The collected fish mucus was stored at 4°C for further use. 5ml of the mucus samples were collected aseptically from the fish and thoroughly mixed with equal quantity of sterilized physiological saline (0.85% NaCl) and the mixture was centrifuged at 5000 rpm for 15 minutes. The supernatant was collected and stored at 4°C for studying the antimicrobial activity.

B. Determination of antimicrobial assay

Antimicrobial activity was measured using the standard method of well diffusion on Asthana Hawkers agar medium plates. 0.1 ml of each bacterial culture was spread and plated on Asthana Hawkers agar medium and incubated for 24 hrs at 37°C. The concentration of bacterial suspensions was adjusted to 108 colony forming units (108 cfu/ml). Wells holding the capacity of 30 µl were cut using a sterile cork borer.

III. RESULTS

In our present investigation antimicrobial activities of skin mucus secretion of *Channa panctatus* and *H. fossilis* exhibited very strong antibacterial activity against all selected microbes.

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Tab.1. Anti-bacterial activity of *Channa panctatus* Skin Secretion

Micro Organism	Skin Secretion (ZOI in mm)
Escherichia coli	25mm
Klebsiella pneumoniae	19mm
Staphylococcus aureus	30mm
Proteus vulgaris	28mm

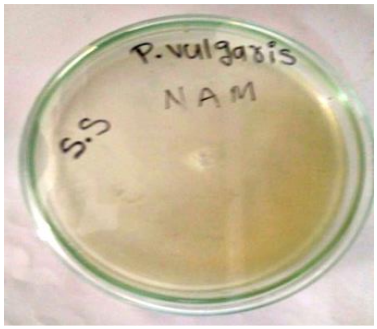
ZOI= Zone of Inhibition

Plate.I Showing Anti-bacterial activity of *Channa panctatus* Skin Secretion

A. Skin Secretion with *E. coli*

B. Skin Secretion with *K.pneumoniae*

C. Skin Secretion with *S.aureus*



D.* Skin Secretion with *P.vulgaris

Results obtained from present investigation are presented in table.1, Plate I. The highest inhibition zone against *staphylococcus aureus* (30mm) and lowest activity towards *Klebsilla* species was shown by skin secretion. Skin secretion have showed inhibition zones with nearest values like viz., *Escherichia coli, Klebsiella pneumonia, Staphylococcus aureus, Proteus vulgaris* with 25mm,19mm,30mm,28mm respectively. In our investigation it is evident that both the skin secretion have potency to inhibit the growth of all bacterial strains tested. In our present investigation antibacterial activities of skin mucus secretion of *Channa punctatus and H. fossilis* and exhibited strong antibacterial activity against all selected microbes. According to our investigation *E. coli* has shown high ZOI (Zone of inhibition) and *K. pneumonia* showed least ZOI. *S. aureus* and *P. vulgaris* have shown medium inhibition zones. The measurements of inhibitions zones like viz., *Escherichia coli* (30.78) and *Klebsiella pneumonia* (20.35) *and Staphylococcus aereus* (23.35) and *Proteus vulgaris* (25.66) are presented Table 2. and Plate.2

The present findings suggest that the epidermal mucus secretion of *Channa punctatus and H. fossilis* is a good source of antibacterial compounds. This anti microbial activity might be due to antibacterial proteins present in epidermal mucas as protein was found to be the major component of mucus. The epidermal mucus secretion of *Channa punctatus and H. fossilis* showed a different zone of inhibition against different bractirial strains. Thus indicating antibacterial activity of skin mucus of *Channa punctatus and H. fossilis*.

Tab. 2. Anti-bacterial activity of *H.fossilis* skin mucus secretion

S. No	Bacteria Strain	Secretion ZOI
1	*Escherchia coli*	**30.78 ±0.57mm**
2	*Klebsiella pneumonia*	**20.35 ±0.62mm**
3	*Staphylococcus aereus*	**23.63±0.88mm**
4	*Proteus vulgaris*	**25.66±0.60mm**

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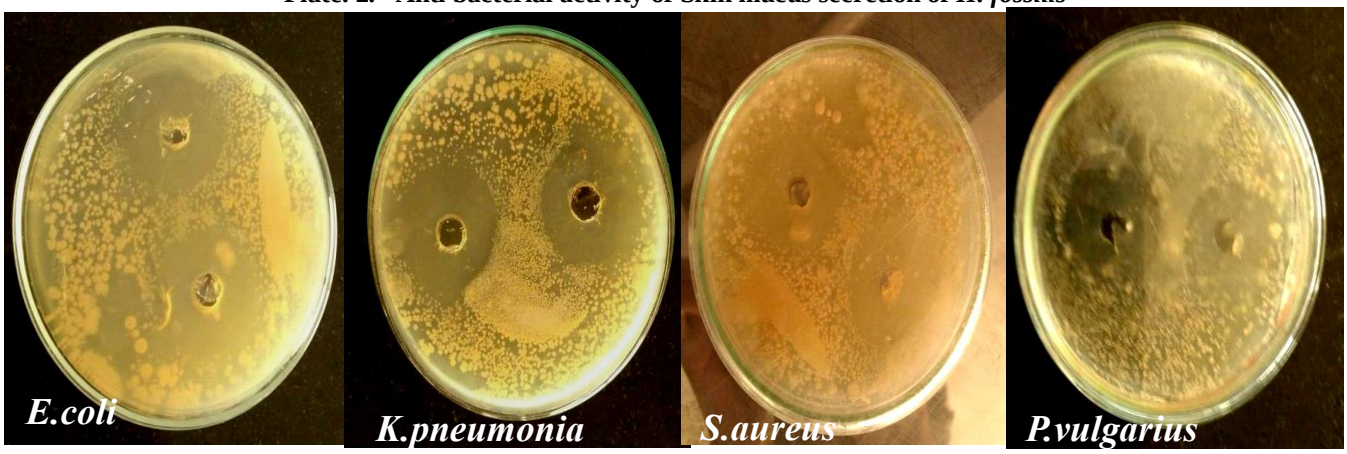
Plate. 2. Anti bacterial activity of Skin mucus secretion of *H. fossilis*

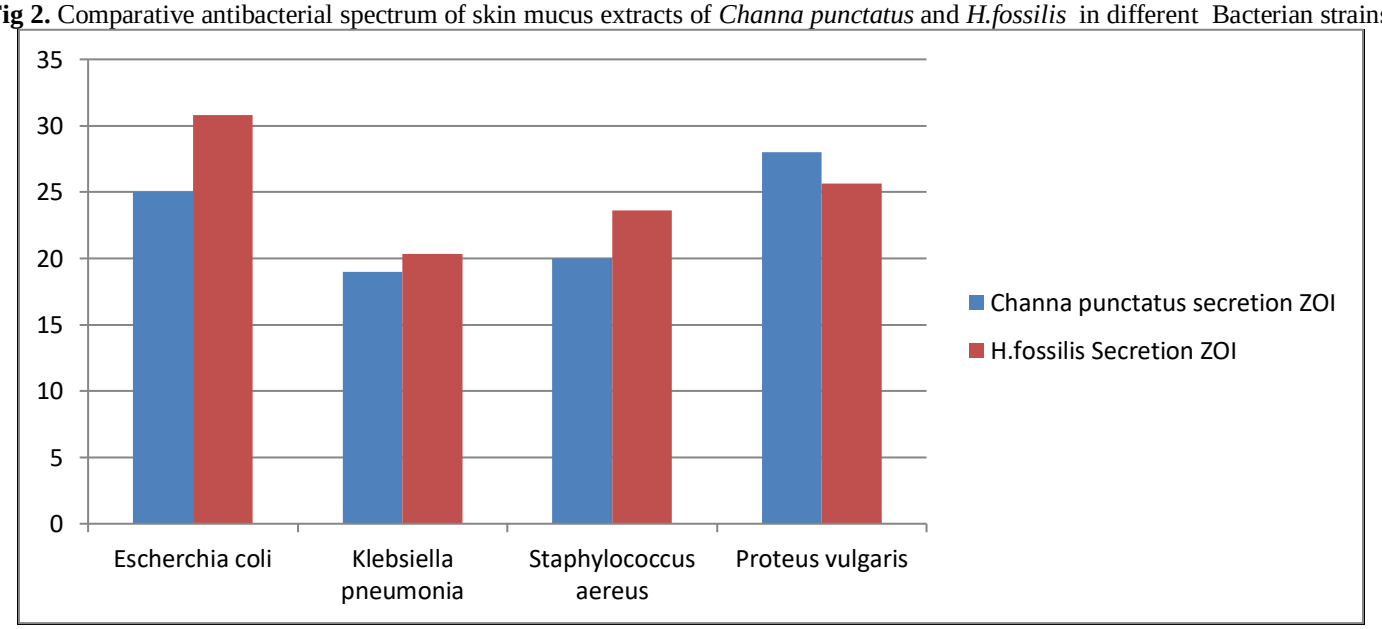


MIC = Minimal Inhibitory Concentration, The Lowest Concentration at which no growth .

Tab. 3. Comparison of Anti-bacterial activity of *Channa punctatus* skin mucus secretion and *H.fossilis* skin mucus secretion

SLNO	Bacteria Strain	Channa punctatus secretion ZOI	*Hfossilis* Secretion ZOI
1	*Escherchia coli*	**25 ± 0.12mm**	**30.78 ±0.57mm**
2	*Klebsiella pneumonia*	**19 ± 0.14mm**	**20.35 ±0.62mm**
3	*Staphylococcus aereus*	**20 ± 0.61mm**	**23.63±0.88mm**
4	*Proteus vulgaris*	**28 ±0.32 mm**	**25.66±0.60mm**

Fig 2. Comparative antibacterial spectrum of skin mucus extracts of *Channa punctatus* and *H.fossilis* in different Bacterian strains.



IV. DISCUSSION

Fishes are always contact with aquatic environment, which contains a wide range of pathogenic and non-pathogenic microorganisms. Epidermis and its mucus secretions act as biological barriers between fish and the potential pathogens of their environment.

Fish mucus is a key component of innate immunity, because of the accumulation of domestic wastes in the aquatic environment has lead the population of microbes being increased rapidly. In order to escape from infectious diseases, mucous secretion of fish play an important role in the prevention of colonization of particles of bacteria and fungi (Black stock 1982**;** Yan *et al*., 2010). Protection of fish against infectious diseases is a major challenge in aquaculture

worldwide. Lysozyme (muramidase) is a ubiquitous antibacterial enzyme identified in a wide range of organism including fish. It acts directly on bacteria (Saurabhi & Sahoo, 2008). Acid phosphatase and alakaline phosphatase increased activities were observed during skin regeneration in the cat fish *H. fossilis*. Ebarn *et al*., (1999) also reported pore forming properties of protein extracted from fish epidermal mucus. The action these antibacterial peptides is non-specific and rapid; they kill bacteria by a pore formation in cell membranes followed by disruption and solublization (Andreu 1999, Anil Tyor 2016). Mucus contain pore forming compound glycoprotein (Tirupati 2011), proteases (Shai 1995), lipo-protein A-I and A-II the source of antimicrobial agents for human & fish pathogens (Shepherd 1993, Ong ye ong wei *et al*., 2013).

U. Kumari (2011) reported that *Channa* and *Rita* has been showed no ZOI, but Anil (2016) reported antibacterial activity of crude mucus and aqueous mucus extract of *H. nobilis* against microbial strains and maximum ZOI was exhibited by *S. epidermidis* followed by *E. coli* (32.83;32.66mm), *B. cereus* (29.25), *P. aeruginosa* 927.620, *S. aureus* (26.33) and *K. pneumonia* (23.58). The present investigations was suggest that the epidermal mucus secretion *of Channa punctatus* and *H. fossilis* is a good source of antimicrobial compounds.

V. CONCLUSION

Antibacterial activity is use full for knowing the proteins present in the mucus secreation further study is necessary for more information.

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