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THE BACTERIAL FLORA OF FRESHWATER FISHES FROM FOUR MARKETS OF BHOPAL

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Abstract: **Bacterial flora of freshwater fishes from four fish markets of Bhopal was accessed. The skin, gills, muscles and intestine of Channa punctatus, Channa striatus, Clarias batrachus, Xenentodon cancila, Mystus cavasius, Labeo rohita, Labeo gonius, Hilsa toli, Chanda nama and Puntius sarana were examined. As a result of investigation five different species of bacteria namely Aeromonas hydrophila, Pseudomonas fluorescence, Salmonella, Shigella, Streptococcus and Staphylococcus were isolated and identified, the public health and economic significance were discussed.**

Keywords: **Micro-organisms, freshwater fishes, public health, economic significance.**

I. INTRODUCTION

Water is a natural habitat for a wide variety of micro-organisms including bacteria, protozoa, algae and fungi. Hence, fishes and other aquatic animals may accumulate these organisms from their environment. Fishes from polluted waters may also carry bacteria, derived from human and animal sources. Shewan (1977) indicated that the microbial flora of fish is a function of the environment in which they are caught. While these micro-organisms may not be pathogenic to fish, the role fishes in the possible transfer of pathogens between livestock and humans is important, particularly in less developed countries FAO (2003).Pathogens can affect human health through active and passive contact. fish are involved in both active and passive transfer of a range of parasites and diseases to humans, broadening the need for risk assessment. Threats to public health from aquaculture is diverse as well as the negative impact on the marketability, trade and consumer confidence (Subasinghe et al., 2001).

Over the past three decades aquaculture has expanded, intensified and diversified, based heavily on movements of live aquatic animals and animal products. The rapid expansion of aquaculture continuously surpasses the rate of education, research and adaptation of expertise in health management. Advances in live aquatic animal trade, facilitated by improved transportation efficiency are now recognized as having played a vital role in the introduction and spread of pathogens into many aquaculture systems (Berth, 2000; Humphrey, 2001; Subasinghe and Arthur, 2001).

II. MATERIAL AND METHODS

Fish samples were collected from four major fish markets of Bhopal viz. Itwara, Bittan, Piplani and Govindpura and transferred to laboratory. Species of fishes include, Channa punctatus, Xenentodon cancila, Mystus cavacius, Labeo rohita, Labeo gonius, Channa striatus, Hilsa toli, Chanda nama and Puntius sarana. The fish smears were obtained from the skin, gills, muscles and intestine.

Preparation of Smears: Smears from the skin were obtained from the lateral sides of the body and caudal fin by sterile spatula. Smears from the gills were obtained by clipping the operculum and thereby exposing the gills underneath. Samples from viscera were obtained by opening the body cavity.

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Microbial Analysis Of Samples: Inocula was obtained from the smear and inoculated with sterile inoculating loop on Nutrient agar, Pseudomonas isolation agar, Trypticase soy agar, Triple sugar iron agar, Bismuth sulphite agar and Deoxychocolate agar incubated at 37 ºC for 24hrs. Colonies were examined, Gram stained and subjected to morphological and biochemical characterizations and identified.

III. RESULTS

Five Gram negative bacterial species namely, Aeromonas hydrophila, Pseudomonas fluorescence, Salmonella, Shigella, Streptococcus and Staphylococcus were isolated.

Channa puctatus:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	$3.0x10^3$ CFU/g	$5.5x10^3$ CFU/g	$1.5x10^3$ CFU/g	$9.0\ x10^3$ CFU/g
Pseudomonas fluorescens	$10.5x10^3$ CFU/g	Nil	$1.5x10^3$ CFU/g	$5.4x10^3$ CFU/g
Streptococcus iniae	Nil	Nil	Nil	$10.0x10^3$ CFU/g
Staphylococcus aureus	$2.6x10^3$ CFU/g	$3.5x10^3$ CFU/g	Nil	Nil
Salmonella sp.	$1.5x10^3$ CFU/g	Nil	$2.5x10^3$ CFU/g	Nil

Hilsa toli:-

Bacteria	Skin	Gills	Muscles	Intestine
Pseudomonas fluorescens	$10x10^3$ CFU/g	Nil	Nil	$3.5x10^3$ CFU/g
Streptococcus iniae	$4.1x10^3$ CFU/g	Nil	Nil	$3.6x10^3$ CFU/g
Staphylococcus aureus	$10.0x10^3$ CFU/g	$10.0x10^3$ CFU/g	$5.0x10^3$ CFU/g	$8.4x10^3$ CFU/g
Shigella sp.	$9.0x10^3$ CFU/g	Nil	Nil	$4.5x10^3$ CFU/g
Salmonella sp.	$4.4x10^3$ CFU/g	Nil	Nil	$2.5x10^3$ CFU/g

Xenentodon cancila:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	$3.0x10^3$ CFU/g	$6.5x10^3$ CFU/g	$1.5x10^3$ CFU/g	$7.0x10^3$ CFU/g
Pseudomonas fluorescens	$1.25x10^3$ CFU/g	$1.5x10^3$ CFU/g	$2.5x10^3$ CFU/g	$3.4x10^3$ CFU/g
Streptococcus iniae	$9.1x10^3$ CFU/g	Nil	Nil	$9.7x10^3$ CFU/g
Staphylococcus aureus	$5.5x10^3$ CFU/g	$3.5x10^3$ CFU/g	Nil	$3.5x10^3$ CFU/g
Shigella sp.	Nil	Nil	$4.5x10^3$ CFU/g	$10.0x10^3$ CFU/g
Salmonella sp.	$2.5x10^3$ CFU/g	$10.0x10^3$ CFU/g	Nil	$10.5x10^3$ CFU/g

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Mystius cavacius:-

Bacteria	Skin	Gills	Muscles	Intestine
Pseudomonas fluorescens	$2.0x10^3$ CFU/g	Nil	Nil	$4.5x10^3$ CFU/g
Streptococcus iniae	$6.1x10^3$ CFU/g	Nil	Nil	$3.0x10^3$ CFU/g
Staphylococcus aureus	$3.6x10^3$ CFU/g	$8.0x10^3$ CFU/g	$2.0x10^3$ CFU/g	$4.4x10^3$ CFU/g
Shigella sp.	$7.9x10^3$ CFU/g	Nil	Nil	$4.5x10^3$ CFU/g
Salmonella sp.	$10.0x10^3$ CFU/g	Nil	Nil	$10.0x10^3$ CFU/g

Labeo rohita:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	$4.0\ x10^3$ CFU/g	$5.5\ x10^3$ CFU/g	$2.5\ x10^3$ CFU/g	$6.0\ x10^3$ CFU/g
Pseudomonas fluorescens	$3.1x10^3$ CFU/g	$0.5x10^3$ CFU/g	$1.5x10^3$ CFU/g	$2.0x10^3$ CFU/g
Streptococcus iniae	$9.1x10^3$ CFU/g	Nil	Nil	$1.9x10^3$ CFU/g
Staphylococcus aureus	$5.5x10^3$ CFU/g	$3.5x10^3$ CFU/g	$2.0x10^3$ CFU/g	$3.5x10^3$ CFU/g
Shigella sp.	$0.6x10^3$ CFU/g	Nil	Nil	$0.41x10^3$ Cfu/g
Salmonella sp.	$2.5x10^3$ CFU/g	$10.0x10^3$ CFU/g	Nil	$7.5x10^3$ CFU/g

Chanda nama:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	$4.0\ x10^3$ CFU/g	$6.8\ x10^3$ CFU/g	$1.5\ x10^3$ CFU/g	$6.0\ x10^3$ CFU/g
Pseudomonas fluorescens	$10.5x10^3$ CFU/g	$10.5x10^3$ CFU/g	$3.5x10^3$ CFU/g	$10.0x10^3$ CFU/g
Streptococcus iniae	$2.9x10^3$ CFU/g	Nil	Nil	$2.55x10^3$ CFU/g
Staphylococcus aureus	$1.5x10^3$ CFU/g	$0.5x10^3$ CFU/g	$1.0x10^3$ CFU/g	$1.5x10^3$ CFU/g
Salmonella sp.	$1.5x10^3$ CFU/g	$4.0x10^3$ CFU/g	Nil	$6.5x10^3$ CFU/g

Punctius sarana:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	8.0 x10^3 CFU/g	6.5 x10^3 CFU/g	2.5 x10^3 CFU/g	4.0 x10^3 CFU/g
Pseudomonas fluorescens	6.5x10^3 CFU/g	Nil	Nil	4.25x10^3 CFU/g
Streptococcus iniae	10.5x10^3 CFU/g	Nil	Nil	9.5x10^3 CFU/g
Staphylococcus aureus	4.0x10^3 CFU/g	5.0x10^3 CFU/g	Nil	2.4x10^3 CFU/g
Shigella sp.	5.5x10^3 CFU/g	Nil	3.0x10^3 CFU/g	3.8x10^3 CFU/g
Salmonella sp.	4.2x10^3 CFU/g	Nil	4.0x10^3 CFU/g	1.5x10^3 CFU/g

Labeo gonius:-

Bacteria	Skin	Gills	Muscles	Intestine
Aeromonas hydrophila	2.0 x10^3 CFU/g	4.5 x10^3 CFU/g	1.0 x10^3 CFU/g	2.0 x10^3 CFU/g
Pseudomonas fluorescens	6.5x10^3 CFU/g	Nil	Nil	4.5x10^3 CFU/g
Streptococcus iniae	1.25x10^3 CFU/g	Nil	Nil	3.5x10^3 CFU/g
Staphylococcus aureus	1.5x10^3 CFU/g	1.0x10^3 CFU/g	Nil	6.4x10^3 CFU/g
Shigella sp.	10.0x10^3 CFU/g	Nil	4.0x10^3 CFU/g	7.0x10^3 CFU/g
Salmonella sp.	4.0x10^3 CFU/g	Nil	Nil	5.5x10^3 CFU/g

IV. DISCUSSION

Most of the micro-organisms isolated are found in water and soil and are capable of causing serious diseases in fishes and human beings. The presence of these pathogens is an indication of food-borne illness followed by cramps, abdominal dropsy and gastrointestinal disorders. There is a risk to people who consumes the infested fish especially young children, elderly people, pregnant women and those who handle or prepare fish (FAO, 2003). The fish farmer undergoes economic crunch because of the rejection of the produce and the consumer suffers ill health due to consumption of fish containing zoonotic agents (Babu, 2000).

Health management and personal hygiene practices would ensure good quality, optimize yield and reduce the incidence of food-borne illness.

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