

Prevalence of Pathogenic Microorganisms in Two Commercially Important Marine Fishes of Nizampatnam, East Coast of India

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Abstract

The present study was under taken on microbiological quality of two commercially important marine fishes *Upeneusvittatus* and *Sphyraenaflavicauda* collected from nizampatnam, east coast of India. The skin, meat, intestine and gills of two fishes were analyzed for total bacterial count (TBC), *Escherichia coli*, Total fecal coliform (TFC), *Staphylococcus aureus*, *Salmonella spp.*, *Shigella spp.*, yeast and moulds count and vibrio spp. Isolation and identification of pathogenic bacteria was done according to US-FDA bacteriological analytical manual.

The result of the study shows that pathogenic bacteria were found in both fishes. The load of *Vibrio spp.* (4.2-4.6 log) and *E. coli* (4.3 log) were high when compared to other pathogenic bacteria. The fish samples found to contain high pathogenic bacterial load and necessary action should be taken to control the pathogenic microorganisms in these fishes before marketed.

Keywords: *Upeneusvittatus*, *Sphyraenaflavicauda*, microbial quality, TBC, TFCC, US-FDA, nizampatnam

I. INTRODUCTION

Fish and Fish products are the most important source of proteins in human diet [1], It contains all ten essential amino acids which are useful to the entire human kind [2]. Fish is also a Vitamin and Mineral-rich food [3]. The pathogenic microorganisms present in the marine water normally contaminate the fish and causes undesirable changes in the fish. It is additionally viewed as that the nature of fish relies upon the nature and quality of water where fishes are collected and also the status of the fish landing centre. Microbial pollution on fishes depends on the condition that can be exchanged for sustenance items straight forwardly through contact by individual developments during cleaning procedure [4]. The contamination of microorganism in the interior fish organs results in breakdown of the immunological guard component framework [5].

The aim of the study is to determine the microorganisms from skin, meat, intestine and gills of two commercial important fishes i.e., *Upeneusvittatus*, *Sphyraenaflavicauda*, of Nizampatnam fish landing centre.

II. STUDY LOCATION

The fish samples were collected from the fish collection center of Nizampatnam situated at east coast of India (Figure-1). The fishes *Upeneusvittatus*, *Sphyraenaflavicauda* are available throughout the year and used for human consumption. The fish landing centre of Nizampatnam has modern facilities like electrical balances, insulated packing systems, etc.

III. MATERIALS AND METHODS:

A. Sample Collection:

Upeneusvittatus (goat fish) and *Sphyraenaflavicauda* (barracuda) were collected in a sterile polythene bag from Nizampatnam fish landing centre and brought to the lab for further analysis in aseptic condition.

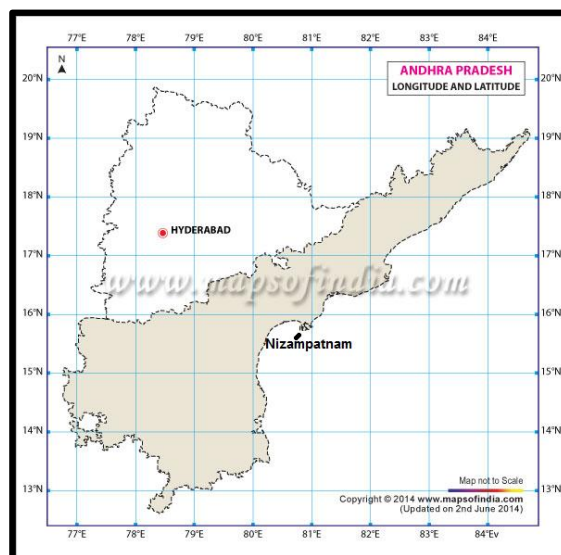


Figure 1: Sampling Area -Nizampatnam Outline Map

B. Microbial Analysis

The microbiological parameters were done according to US-FDA bacteriological analytical manual.

Microbial analysis was done for four parts of each fish. These parts are skin, meat, intestine and gills of fish. These parts are analyzed for Total bacterial count (TBC), *E. coli*, Total fecal coliform count (TFCC), Yeast and moulds, *Salmonella spp.*, *Shigella spp.* and *Vibrio* species.

C. Sample Preparation:

25 gram of each part meat, intestine of fish was added in to 225 ml of buffered peptone water. For microbial analysis of skin and gills, 1 g of the sample was added to 9 ml of buffered peptone water. The sample was mixed thoroughly in the buffered peptone water and 0.1ml of this sample was inoculated on to different selective media by spread plate method.

IV. ENUMERATION, ISOLATION AND IDENTIFICATION OF ISOLATES

Different media was used for the isolation of different pathogenic bacteria. Nutrient agar for total bacterial count, Mac-Conkey agar for *E. coli*, manitol salt agar for *S. aureus*, sabouraud dextrose agar for yeast and moulds, *Salmonella Shigella* agar for *Salmonella spp.*, *Shigella spp.*, Thiosulfate citrate bile salt (TCBS) agar for *Vibrio spp.* After the inoculation the plates were incubated at 37°C for 24-48h. For yeast and moulds the plates were incubated at room temperature for 48 hours.

V. MICROBIAL COUNT

The mean number of colonies counted was expressed as log colony forming units (log₁₀cfu/gm)

VI. RESULT AND DISCUSSION

Microbiological quality of different parts of fishes is shown in Chart 1 & 2.

The Total Bacterial count range was more in *Upeneus vittatus* Skin, gills (log 4.6 to log 4.9) and lowest in meat, Intestine and Gills of *Sphyraena flavicauda*. The bacterial flora of the fish depends on the environmental conditions where it was caught.

Indicator Organisms like *E. coli* and Total Fecal Coliform Count (TFCC), were found in both the fishes. The range of *E. coli* was from log 3.3 to log 4.3 and it is higher in *Sphyraena upeneus* skin. The population of *E. coli* was less in *Sphyraena* intestine. *Staphylococcus aureus* population was ranged from log 0.00 to log 3.7, and it is higher in *Sphyraena* skin when compared to *Upeneus* meat.

Almost, all the values of *E. coli* are exceeded the FSSAI limits, which is not more than 20/gm^[6], like that TFCC values are also exceeded the IAMS limits, which should not be more than 100/gm^[7]. The

Presence of *E. coli* and fecal coliform interfere the quality of fish. The presence of *E. coli* in higher range indicates the contamination of the samples during handling and processing^[8]. Fish harvested around fecal contaminated water can carry *Salmonella*^[9]

The Present study shows that yeast and moulds contamination was more in *Upeneus* Skin than *Sphyraena* meat. The log value was ranged between log 3.0 to log 3.9.

Salmonella spp., and *Shigella spp.*, were found in all samples which are highly pathogenic, this may be because of improper handling and processing at Nizampatnam fish landing centre. *Salmonella* population was ranged from log 3.5 to log 4.3. Its contamination was more in *Sphyraena* skin when compared to its meat. *Shigella spp.*, ranged from log 3.0 to log 4.4, where its population was more in *Sphyraena* intestine, gills and less in *Upeneus* skin.

Vibrio species was also found in all parts of the fish samples, According to the International Association of Microbiology Societies Fresh and Frozen fishes should be free from *Vibrio*^[10]. The *Vibrio* population was more in *Sphyraena* skin and less in *Sphyraena* intestine and gills

VII. CONCLUSION

Microbial Flora on Skin and Gills will transient the condition of the water and handling^[11]. Organism in the intestine shows the contamination in digestive track. The good quality fish should have Total Bacterial count not more than 5, 00,000/gm as per the FAO. *E. coli* should not be exceeded 20cfu/gm. Total Fecal Coliform should not be exceeded more than 100cfu/gm as per FAO^[12]. Plate count and coliform count have been used regulating microbial quality of the food. In the present study, Total Bacterial count readings are normal, but other pathogenic organisms are above the ICMSF guidelines^[13]. To modify the situation, it is necessary to follow the code of practice while handling of the fish post harvesting procedures and maintain the cleanness in the fish landing centre.

The present study, provide the information about the pathogenic load of the fish parts which results in causing foodborne diseases.

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Chart 1: Microbial Population in Varies Parts of Openeusvittatus Fish Sample

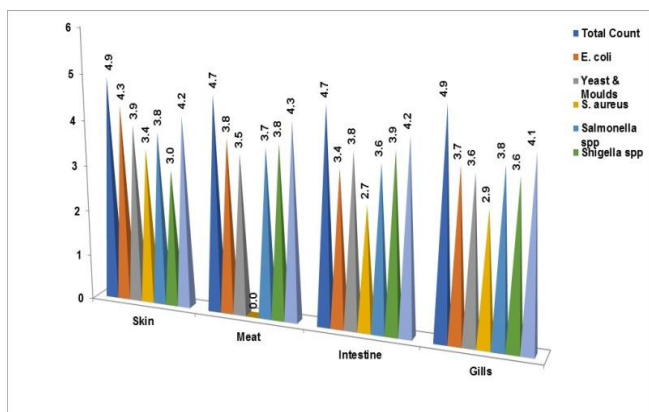
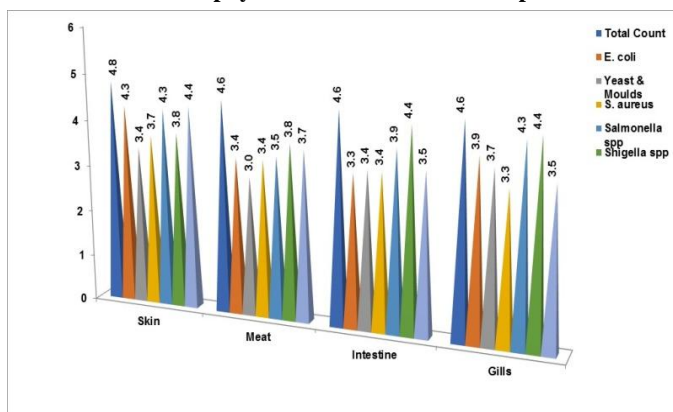


Chart 2: Microbial Population In Varies Parts of Sphyraneaflavicauda Fish Sample



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