Incidence of Pathogenic Microorganisms in Marine Fish Collected from Fish Landing Centre and Market of Machilipatnam, East Coast of India

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Abstract:
A study was under taken to assess the microbial quality of important edible marine fish collected from fish landing center and market of Machilipatnam. The skin, meat, intestine and gills of black pomfret were analyzed for total bacterial count(TBC), Escherichia coli,Total fecal coliform(TFC), Staphylococcus aureus, Vibrio spp.,Salmonella spp., Shigellaspp.,Yeast and mouldscount. Isolation and identification of pathogenic bacteria was done according to US-FDA bacteriological analytical manual.The results of the study indicated that pathogenic bacteria detectedin different parts of fishes collected from two localities. It waslittle more in market samplescompared to fish landing centre. In market samples shigella spp., were ranged from log 4.0 to 4.6, E. coli were ranged from 3.6 to 4.5 were found in high log concentration, when compared to fish landing center machilipatnam. Necessary action should be taken to control the pathogenic microorganisms during transport and storage of fishes.

Keywords: *BlackPomfret, Microbial Quality, TBC, TFCC, US-FDA, Machilipatnam.*

I. INTRODUCTION

Fish and Fish products are the most important source of proteins in the 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 presence of pathogenic microorganisms in fishes normally causes undesirable changes in fish during post collection period. The good quality of fish also depends on the cleanliness of collection center, quality of marine water and the care taken during transportation of fish from landing center to market.

The other factors like handling practices of the vendors including the water used to sprinkle on fishes also influence the microbiological quality of fishes[4].

The aim of this study is to evaluate the incidence pathogenic microorganisms found in different fish parts of fish collected from fish landing centre and market of Machilipatnam.

II. STUDY LOCATION

The fish samples were collected from fish landing center and market of machilipatnam east coast of India (Figure 1) the fish *black pomfret* is available throughout the year and used as human consumption.

III. MATERIALS AND METHODS

A. Sample Collection

Commercially important edible marine fishes *Parastromateus niger*(*black pomfret)* were collected in sterile polythine bag from Machilipatnam fish landing center and local fish market. The collected fish samples were transported to the lab in aseptic conditions for further analysis.

IV. MICROBIAL ANALYSIS

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

Microbial parameters were analyzed from the four parts of fish these parts are skin, meat, intestine and gills. These four parts are separated aseptically and analyzed for microbial analysis which includes Total bacterial count (TBC),E. coli, Total fecal coliform count(TFCC), yeast and moulds, qualitative analysis of salmonella spp., shigella spp., and vibriospecies.

Figure1: Machilipatnam Location Map
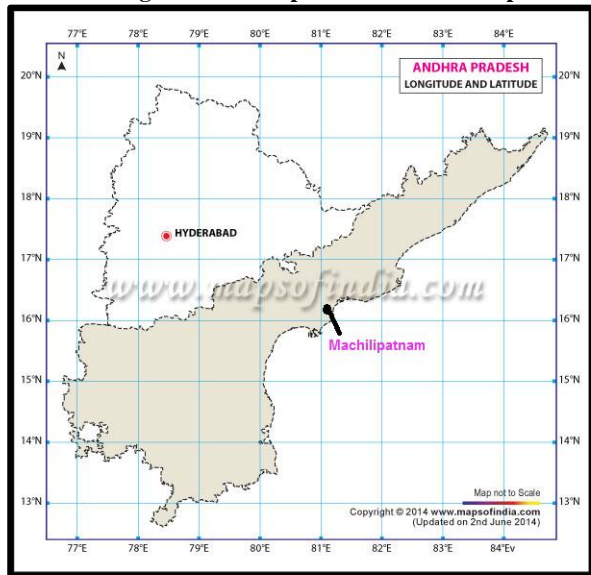
Sample Preparation

25 gram of each part (meat and 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.

A. Enumeration, Isolation And Identification Of Isolates

Different media was used for the isolation of different pathogenic bacteria. Nutrient agar for total bacterial count, MacConkey agar for *E. coli*, manital 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 37^0c 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 were counted and expressed as log colony forming units (log10cfu/gm)

VI. RESULTS AND DISCUSSION

Microbiological quality of different parts of fishes was shown chart 1&2.

The Total Bacterial count found in market samples was ranged from 4.6 to 4.9 log. Where as in landing center it was between 4.5 to log 4.8.

Indicator Organisms, like *E. coli* and Total Fecal Coliform Count (TFCC), were detected in both the places. In fish landing centre, *E.coli* population ranged from log 3.4 to log 4.3, and in market the population ranged from log 3.6 to log 4.5.The values of *E. coli* are exceeding the limits of IAMS [5].The Presence of coliforms group of *E. coli* indicate the contamination of the sample before or after handling and processing [6].

Staphylococcus aureus population ranged from log 3.3 to 3.7 in fish landing centre where as in market it was log 3.6 tolog 3.8.

The present study shows that yeast and moulds count was ranged from log 3.3 to log 3.8 in fish landing center and log 3.5 to log 3.9 in market samples.

Salmonella spp. and Shigella spp. were found in all samples which are highly pathogenic. This may be because of improper handling and processing at both the collection centers.

Salmonella population ranged from log 3.8 to log 4.2 in fish landing centre. Its population was little high in market samples which ranged from log 3.9 to log4.3.Fish harvested around fecal contaminated water can carry Salmonella [7]. Shigella spp., ranged from log 3.9 to log 4.5 in fish landing centre, and in market it was ranged from log 4.0 to log 4.6.

Vibrio species was detected in both the samples collected from fish landing center and market. According to the International Association of Microbiology Societies Fresh and Frozen fishes should be free from Vibrio[8]. In Fish Landing centre the population was ranged from log 3.2 to log 4.2 and in market it was ranged from log 3.6 to log 4.3.

VII. CONCLUSION

The contamination of pathogenic microorganisms little higher the samples obtained from market when compared to fish landing centre. This contamination may be due to poor handling practices of the vendors at fish market and landing center. Improper transportation facility is also one of the reasons for high microbial load. The good quality fish should have Total Bacterial count not more than 5,00,000/gm as per the FSSAI. The *E. coli* should not be exceeded 20/gm, Total Fecal Coliform should not be exceeded more than 100/gm as per FSSAI [9]. In the present study, Total Bacterial count readings are normal, but TFCC readings are above the ICMSF guidelines[10].

Increase in the rate of fish spoilage affects the nutritional quality. Most of the fish vendors do not have the knowledge on factors effecting fish spoilage and how to regulate the process [11]. Awareness program should be conducted for the fish vendors on proper handling and processing. This would be enable them to acquire good quality fish for safe consumption [12].

VIII.   ACKNOWLEDGEMENT

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Chart 1:Microbial Population in Varies Parts Of Black Pomfret in Landing Centre
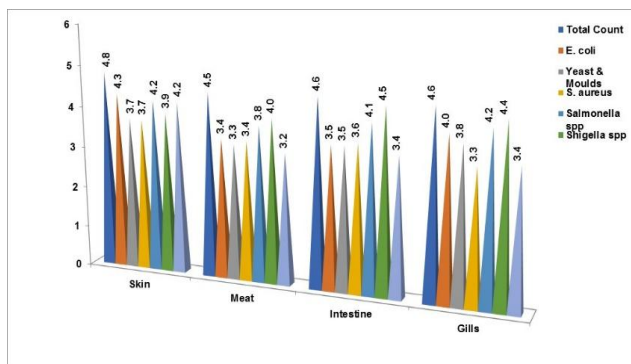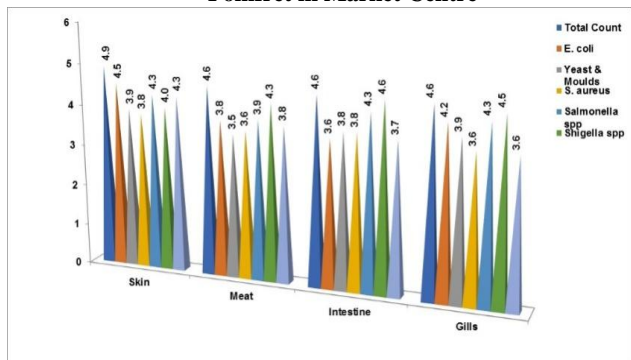

Chart 2:Microbial Population in Varies Parts of Black Pomfret in Market Centre

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