



FRESH AND SMOKED *MUGIL CEPHALUS* TESTED IN LABORATORY FOR ITS MICROBIAL QUALITY AVAILABLE IN VISAKHAPATNAM MARKET

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ABSTRACT: Microbiological quality was analysed for Fresh (FF) and market smoked (MS) *Mugil cephalus* available in Visakhapatnam market during March and April, 2015. A few of the fresh fishes were laboratory smoked after treating with various salt concentration in 4% and 5%. Total plate counts of bacteria (TPC) in fresh and market smoked *Mugil cephalus* were 103 and 105 respectively. Fungus was not detected in FF but it was 103 in MS. faecal streptococci, Count of *Staphylococcus aureus* and *salmonella* were higher in MS than FF. *Coliform* was not detected in MS however, these were found in FF. In both the samples *E.coli* was not found. Total plate count of fungi and bacteria were very low in the laboratory smoked (LS) *mugil cephalus* with different salt concentrations.

Key words: *Mugil cephalus*, Market Smoked, Laboratory smoked.

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INTRODUCTION

In the diet of Andhra Pradesh people, fish is an important source of protein. Smoking not only imparts color and flavour, but also has a preservative effect since formaldehyde; phenol and other substances evolved from smoke are deposited on the fish during the process [1]. The fishes are consumed after frying or roasting or as an ingredient in vegetable curry preparation to add flavor and taste [2]. Though there are reports on smoke curing of fish from India as well as from abroad [3, 4], in Andhra Pradesh the age old technique is different from others as salting is not involved in the processing. *Mugil cephalus* which is fresh and smoked is one of the most important fish in Andhra Pradesh. The health and hygiene of a fish is the basic concern to be cured in such condition. By the microbiological analysis of the fish its hygienic quality is judged. This is the purpose of undertaking the work. microbiological quality of *mugil cephalus* of fresh (FF), market smoked (MS) in traditional Andhra style is reported in this paper, which are easily available in Visakhapatnam market and laboratory smoked(LS) after treating with salt in a specially designed kiln.

MATERIALS AND METHODS

The fresh *Mugil cephalus* and smoked *mugil cephalus* of length is 35cm and a maximum weight 2 kg were purchased from different fish sellers and brought to the laboratory. Details of total plate count (TPC), total fungal count(TPC), and most probable number (MPN) of coliforms and detection of pathogenic bacteria viz., *Staphylococcus aureus*, faecal *Streptococci*, *Salmonella* and *E.coli* were done as per APHA [5].

TCP was enumerated on trypton agar. TFC on acidified potato dextrose agar, MNP of *coliforms* an brilliant green lactose bile broth (BGLB); *E.coli* on eosin methylene blue(EMB) agar after enrichment in BGLB, *Salmonella* on brilliant agar (BGA) after enrichment in selenite cysteine broth (SCB) and faecal *streptococci* on KF Streptococcal agar. The pathogenic bacteria colonies were further tested using methods of APHA [5] and Fungal colonies on PDA were selected and stained with cotton blue in lacto phenol and identified following the method of Gilman [6] and Ellis [7,8].

RESULTS AND DISSCUSSION

The fungal and bacterial count of fresh and smoked *Mugil cephalus* is shown in table 1. MS had the highest TPC (105g-1) followed by FF (103g-1) and LS (10g-1) *Staphylococcus aureus*, Faecal *Streptococci* *Coliforms*, *Salmonella* and *Ecoli* were not detected in LS except very low count of *S.aureus* and faecal *streptococci* in 2% salt smoked fish. These lower values might be due to the assimilation of salt in smoking. Coliform was absent in the MS however TFC, *S.aureus*, faecal *Streptococci* and *Salmonella* were high in the MS than the FF. The smoked fishes also available in market are not salted and this may be the cause for higher microbial count. The reasons of contaminations occur during processing, storage, handling and selling in the market might also be the reasons for higher count of bacteria. Microfloral count is associated to the moisture content of the sample. Lowering of moisture retards the spoilage of fish [1]. In this experiment both MS and LS have high moisture content (49.15-52.57%). Though microfloral count is much higher in MS. Decrease in microfloral count in LS might be due to the treatment of salt previous to Smoking as well as taking care during processing storage and handling.

Table 1. Bacterial and fungal count of fresh and smoked *Mugil cephalus* available in Visakhapatnam market.

Parameters	Fresh <i>Mugil cephalus</i>	smoked <i>Mugil cephalus</i>
Total plate count(TPC) g ⁻¹	8 x 10 ³ - 9.9 x 10 ³	5.0 x 10 ⁵ - 7.6 x 10 ⁵
Total fungal count(TFC) g ⁻¹	ND	3.2 x 10 ³ - 4.7.6 x 10 ³
<i>Staphylococcus aureus</i> g ⁻¹	4.4 x 10 ³ - 5 x 10 ³	3.0 x 10 ⁴ - 4 x 10 ⁴
Faecal <i>streptococci</i> g ⁻¹	6.0 x 10 ² - 7.2 x 10 ²	2.5.x 10 ⁵ - 3.6 x 10 ⁵
Coliform (MNP) g ⁻¹	210	ND
<i>Salmonella</i> g ⁻¹	1.7 x 10 ⁴ - 2.2 x 10 ⁴	1.22 x 10 ⁶ - 1.2 x 10 ²

ND- Not detected; Mean value of 6 samples.

Isolated Fungal flora from MS was *Cladosporium* sp. and *candida* sp. The chance of the occurrence of toxic fungi fungal or metabolites leading to food poisoning cannot be controlled unless taken proper care.

Few number of staphylococci is not a serious problem but food poisoning may occur if the product is handled carelessly during processing resulting in multiplication of the organism.

Table 2. Bacterial and fungal count of laboratory smoked *mugil cephalus* with different salt concentrations.

Parameters	3% salt smoked fish	4% salt smoked fish	5% salt smoked fish
Total plate count(TPC) g ⁻¹	2.2 x 10 ² - 3.3 x 10 ²	7.9 x 10 - 9.0 x 10	5.0 x 10 ² - 7.3 x 10 ²
Total fungal count(TFC) g ⁻¹	ND	ND	ND
<i>Staphylococcus aureus</i> g ⁻¹	2.0 x 10	ND	ND
Faecal <i>streptococci</i> g ⁻¹	3.0 x 10	ND	ND
Coliform (MNP) g ⁻¹	ND	ND	ND
<i>Salmonella</i> g ⁻¹	ND	ND	ND

ND- Not detected

Faecal contamination is evidenced by the presence of faecal *Streptococci*, Coliforms and *E.coli*. Their presence in foods possibly indicates the presence of entire pathogens [9]. *E. coli* was totally absent in all the samples and *Salmonella* was reported in FF and MS.

Table 3.Fungal flora present in market smoked *mugil cephalus* (in % of total flora).

Fungi	Market smoked <i>mugil cephalus</i>
<i>Cladosporum</i> sp	15.625
<i>Candida</i> sp	84.375

The results from this present experiment shows fungal and bacterial count in MS is high and it is a matter of immense concern for the health and hygiene of consumers. Attempts may be made to reduce the moisture content of MS by extending the smoking time or by drying in the sunshine. More importantly proper care should be taken during processing, storage, bundling and selling. The fishes should be properly fried, roasted or cooked before consumption.

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REFERENCES

- [1] Stansby, M.E. 1963. Cured fishery products. In: Industrial Fishery Technology (Ed.M.E. Stansby and E.Robert). Krieger Publ. Co., Hunlington, New York.Pp.415
- [2] Singh, M.B., Sarojnalini C and Vishwanath, W. 1990. Nutritive value of sundried *Eromus danricus* and smoked *Lepidocephalus*. Food Chemistry.36:89-96.
- [3] Mariappan,S. Sugumar G and Sukumar D.2004.Survival of Salmonella, Staphylococcus aureus and Vibrio parahaemolyticus in hot-smoked fish (*Nemipterus* sp.) fillets under low temperature storage. Indian Journal of Microbiology.44:117-120.
- [4] Lu, Y.J, Pace, D.R and plahar, D.W.1991.Storage conditions and microbial quality of smoked dry herring in Ghana. J. Food Protect.54:557-559.
- [5] APHA, 1976, Compendium of methods for microbiological examination of foods (Ed.M.L.Speak).American public health Association, Washington.
- [6] Gilman, J.C. 1957.A Manual of Soil Fungi. The Iowa State University Press, Iowa, USA.Pp.450.
- [7] Ellis, M.B. 1976. More Dermatiaceous Hypmycetes.CMI.Kew.Surrey, U.K. Pp.507.
- [8] Ellis, M.B. 1971. Dermatiaceous Hypmycetes. CMI.KewSurrey, U.K. Pp.608.
- [9] Frazier, W.C. and Westhoff, D.C. 1983. Fundamentals of Food Microbiology. Tata Mc Graw, New York.

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