



SEASONAL VARIATION OF BIOLOGICAL HAZARDS IN RASTRELLIGER KANAGURTA (INDIAN MACKEREL) DURING PROCESSING IN SEAFOOD PROCESSING INDUSTRY

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ABSTRACT

The *Rastrelliger kanagurta* (Indian Mackerel, belongs to the Scombridae family) was studied to determine pathogenic microbial load like T.P.C. *Escheria coli*, *Staphylococcus aurias*, *salmonella*, *vibrio cholerae*, *vibrio parahemolyticus*. Samples were collected at middle week of each month throughout the year. The examination was carried in two groups i) Headon ii) Headless forms. Over all year study of I. mackerel concerned to microbial load from the months June to September found to moderate compare to rest of months while October to January found to decrease comparatively whereas from the month February to May it was tremendously increased. The present study; microbial load showing good relation with temperature/season. As environmental temperature increases in summer season i.e. March to May; increasing bacterial load while in winter season i.e. November to January environment temperature decreased decreasing bacterial load whereas in monsoon season environmental temperature is moderate, shows moderate bacterial load comparatively.



KEYWORDS: *Rastrelliger kanagurta*, *Staphylococcus aurias*.

INTRODUCTION

The fish is most perishable food items. The freshness of this highly perishable food item greatly affects the market acceptability; Ismail HM (2005), Sikorski ZE, Kostuch S, Olley J(1976), Shenouda SYK(1980)

Connel JJ(19195). Fish spoilage is majority depends on action of microorganisms and enzymes embedded in fish; Arannilewa ST et.al.(2005). Ammonia and tri-methylamine (TMA) are developed due to these action presents in fishes, which led to the firmness and contamination in the seafood. The degree of reduction in quality relies on several factors, such as the freezing and thawing rate, storage temperature, and storage temperature fluidity; Giddings GG, Hill LH(1978).

Indian Mackerel fish is very delicious and can use in many kinds of seafood dishes that anybody can want but sadly, it was only available during a certain season. With the advancement of freezing technology now available in any season. The buyer, however, needs in fresh condition. But, the consistency measures impaired by freezing include changes in the composition of color, texture, water-retaining capacity, etc. Quicker freezing levels preserved the structural consistency and reduced the chemical reaction of several fish product forms ;Syamaladevi RM et.al (2012) . That is why shelf-life studies with reference to microbial load must be needed or analysed to sustaining the product or available in any season. Nevertheless, work is done on biochemical composition but microbiology of

Indian Mackerel comparatively inadequate, especially from west coast of India. The current study was therefore undertaken for assessing the microbiological aspects of *Rastrelliger kanagurta* (Indian Mackerel) during processing in Sea food Industry. These values would be useful references for consumers, nutritionists, and food processors to choose the Indian Mackerel, based on their appropriate uses.

MATERIALS AND METHODS:

To examine the selected samples pathogenic microbus like T.P.C. *Escheria coli*, *Staphylococcus aurias*, *salmonella*, *vibrio cholerae*, *vibrio parahemolyticus*. This was done at middle week of each month throughout the year. The examination was carried in two groups i.e. i) Headon ii) Headless forms of the Indian Mackerel.

Above all mentioned microbes were examine through the method IS - 5402-2002, IS 5887 - I - 1976 REAFF. 2000, IS 5887-II-1991, IS-5887-III-1999, IS-5887-V-1976. REAFF,2000 respectively / 25gm of sample.

RESULTS AND DISCUSSION:

For to study the microbial load, I. Mackerel (Headon & Headless) were used during processing (fresh) of same group. Experiment were conducted at middle week of each month (date 14 to 21) throughout year . Mean of Findings of respective days were considered to discuss as result. Microbial load in month of Aug from 14 - 21, is discussed below. TPC was found to 1,20,000 in whole (Headon) & 90,000 in gutted (Headless). *E. coli* was found to 12 in whole (Headon) where as 10 in headless condition . *Staphylococcus* found to 60 in head on while 52 in headless condition. *Vibrio cholera* detection was found to nil in headon & headless condition while *salmonella* was not detected in the same. During the collection of sample, water used during processing variety was tested for temperature & chlorine; temperature of headon processing water found to 5°C & headless processing water 4°C where as chlorine content was 1ppm.

Regarding microbial load (Biological hazard) in the month of September from 14 - 21; TPC was found to 1,95,000 in headon & 1,10,000 in headless. *Escheria coli* was found to 15 in head on while decreased to 13 in headless. *Staphylococcus* was found to 58 in headon & it also decreased to 50 in headless condition. *Vibrio cholera* was nil in headon & headless similarly *salmonella* was not detected in both sample (headon & headless). Temperature of headon & headless processing water found to 4°C while chlorine content was 0.9ppm.

In the month of October from date 14 -21, TPC was found to 160,000 in headless while decreased to 1,10,000 in headless. *Escheria Coli* was found to 10 in headon while again decreased to 08 in headless. *Staphylococcus* was found to 50 in headon while decreased to 47 in headless condition. Same result repeated concerned to *Vibrio cholera* & *Salmonella* like month of September.

Temperature of headon processing water found to 5°C white slight decreased temperature was found i.e 04°C of headless processing water whereas chlorine found to 1 ppm.

Results of experiments were conducted in month of November from date 14 -21; TPC was found to 90,000 in headon while decreased to 40,000n in headless condition. *Escheria coli* was found to 05 in headon while not detected in headless condition. *Staphylococcus* was found to 28 in headless while decreased to 18 in headless condition. *Vibrio cholera* & *salmonella* not detected in headless headon sample. Temperature of headon & headless processing water was same i. e. 04°C while chlorine was found to 0.9ppm.

Findings of microbial load in month of December date 14 - 21; TPC was found to 80,000 in headon while decreased to 35,000 in headless condition. *Esheria coli* was found to 05 in headon while again decreased to 02 in headless condition. *Staphylococcus* was found to 25 in headon & decreased to 16 in headless. *Vibrio cholera* & *salmonella* were not detected in headon & headless condition. Temperature of headon processing water was found to 04°C while decrease i. e. 03°C of headless processing water. Chlorine content of water found to 1 ppm.

Result of biological hazard in the month of January from 14 -21; the TPC was found to 82,000 in headon while count decreased to 38,000 in headless condition. Escheria coli was found to 05 in headon while count slight decreased to 04 in headless condition. Staphylococcus was found to 30 in whole while tremendous decreased to 18 in headless condition. Vibrio cholera & salmonella were not detected in headon & headless samples. Temperature of headon processing water was 05°C while it decreased as 04°C of headless processing water whereas chlorine content of was found to 1ppm.

Findings of microbial load in the month of February from date 14 21; the TPC was found to 90,000 in headon while decreased to 45,000 in healess sample. Escheria coli was found to 05 in headon & headless condition respectively. Staphylococcus found to 32 in headon & decreased to 20 in headless condition. Vibrio cholera & salmonella were not detected in both sample i. e. headon & headless. Temperature of headon & headless processing water was same i.e 5°C while chlorine was found to 1ppm.

Result of biological hazards in the month March from date 14 - 21; the TPC was found to 1,00,000 in headon while found to decrease as 50,000 in headless sample. Escheria coli was found to 05 in headon while still slight increase in headless i. e. 06. Staphylococcus was found to 35 count in headon while decreased to 20 in headless sample. Vibrio cholera & salmonella were not detected in headon & headless species. Temperature was found in headon as well as headless processing water was same i. e. 05°C while chlorine was found to 1.5 ppm.

Results of experiment conducted in month of April from date 14 -21; the TPC was found to 1,20,000 in headon sample while decreased to 52,000 in headless. Escheria coli was found to 05 in both headon and headless resp., while staphylococcus found to 36 in headon sample & slight increased to 38 in headless sample. Vibrio cholera & salmonella were not detected in both sample i.e. headon & headless. Temperature of headon processing water was found to 05°C while it decreased as 04°C of headless processing water whereas chlorine was found to 1ppm.

Results of experiments conducted in the month of May from date 14-21; TPC was found to 2,50,000 in headon sample while decreased to 1,70,000 in headless sample. Escheria coli was found to 10 in headon while decreased to 08 in headless condition. Staphylococcus was counted as 60 in headon while slight decreased to 55 in headless sample. Vibrio cholera & salmonella were not detected in both sample. Temperature of headon processing water was found to 06°C while decreased to 05°C in headless processing water whereas chlorine found to 1ppm.

Findings of microbial load in the month of June from date 14-21; TPC was found to 1,25,000 in headon while decreased to 80,000 in headless condition. Escheria coli was found as same count i.e. 06 in both sample(headon & headless). Staphylococcus was found to 35 in headon while slightly decreased to 33 in headless sample. As like previous finding vibrio cholera & salmonella were not detected in headon & headless sample. Temperature of headon as well as headless processing water was found to similar i.e. 4°C whereas chlorine was 1.5ppm .

Results of experiment conducted in month July from date 14 - 21; the TPC was found to 110000 in headon sample while decreased to 85000 in headless. Escheria coli was counted 18 in headon while decreased to 15 in headless sample. Staphylococcus was counted 55 in headon & decreased to 40 in headless condition. Vibrio cholera & salmonella were not detected in headon & headless sample. Temperature of headon & headless processing water was found to similar i.e. 5°C while chlorine was 1ppm.

Over all year studied species I. mackerel concerned to microbial load, it is found that in the months June to Sept. microbial load found to moderate compare to rest of months while October to January found to decrease comparatively whereas from month of February to May it is found to tremendous increase. The present study; microbial load showing good relation with temperature or season. As environmental temperature increases in summer season i.e. March to May ; increasing bacterial load while in winter season i.e. November to January decreased temperature in environment decreasing bacterial load whereas in monsoon season environmental temperature is moderate, shows moderate bacterial load comparatively. Various references are available regarding effect of

temperature on bacterial load, similar results were found to Ramesh P. Parera et.al (1994) , Venkateshwaret et. Al (1988) , Roque A. et. Al (2001) , Abu – Ghazaleh (2001) , Teophilo – Grace – Nazaruth Diogo et al (2002) , matyar et al (2004) , Mccue Patric et al. (2005) , Laursen – Bright et al (2005) , Levin – Robert E (2005) , Hamilton A. et.al (2011), Chakma et al(2020)

Microbial load was also found comparatively maximum in head condition of all selected species, this might be due as animal transported to processing after formal cleaning just after arrival, so possibility of bacterial concentration but further process, cleaning & maintaining temperature results to lower down bacterial load. One possibility is as head reaction of studied animal contains most of digestive enzyme, which provides right for bacterial growth. As head is removed (headless) connection of enzyme supply cut to further body part, resulting lower bacterial load.

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