SUMMARY
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The freshwater edible fish common carp, *Cyprinus carpio* weighing approximately 500g with the length of 30 – 35 cm were collected from fish culture pond of Tamilnadu State Government Fisheries Department, Manimuthar. Fish were stored as whole fish (fresh unprocessed condition), fillets and preservatives treated fillets (fresh processed condition) at ambient and refrigeration temperatures for varying period of time to observe the nature of spoilage and the factors that contribute for spoilage. Stored samples were drawn at two hours interval upto eight hours, and then it was continued at 12th and 24th hours in ambient temperature. Under refrigeration the sampling was done at three days interval upto twenty one days to evaluate the organoleptic, biochemical and microbiological qualities of fish.

The assessment of spoilage was carried out on the basis of organoleptic scores, biochemical and microbiological status of the fish or fish fillet. Biochemical analyses includes determination of pH, moisture, protein, lipid, carbohydrate, peroxide value, free fatty acids, trimethylamine-N, total volatile base-N, ammonia and alpha aminonitrogen. Microbiological changes were assessed on the basis of
THB in gill, gut and muscle tissue of whole fish and in the fish fillets of control and preservative treated groups. Psychrophilic and hydrogen sulphide producing bacteria were also enumerated as a part of microbiological examinations. Distribution of various hydrolytic bacteria such as caseinolytic, gelatinolytic, amylolytic and lipolytic within the THB was also determined.

A significant rise in moisture content of all samples stored was recorded. This increase was comparatively high at ambient than refrigeration temperature. Unprocessed whole fish showed more moisture than the processed fish fillets and preservatives treated fillets.

Protein, carbohydrate and lipid content of all the unprocessed whole fish muscle samples showed significant reduction in their levels from their initial concentration during storage at both the temperatures. However, the reduction was more pronounced at ambient than at refrigeration temperature. Following the whole fish, significant reduction in protein content was noticed in untreated fillets stored at room temperature. This reduction could directly be correlated with the lowered shelf life and organoleptic scores.

Biochemical analyses suggested that the spoilage indicators such as peroxide value, trimethylamine-N, total volatile base-N and ammonia were found to increase significantly during storage in all the samples stored. In general, the levels were found to be high in samples stored at ambient temperature that explains their shorter shelf life. Preservative
dipped fillets showed significant reduction in the level of spoilage indicators than the untreated fillets at refrigeration temperature. Similar trend was observed in the formation of free fatty acids and alpha amino nitrogen also.

Microbiological analysis of fillets revealed that the total heterotrophic, psychrophilic and hydrogen sulphide producing bacterial population varied with the type of sample and storage temperature. In the muscle of freshly caught carp, the bacterial species such as Bacillus sp., Micrococcus sp., Pseudomonas sp., Flavobacterium sp. and Vibrio sp. were recovered. Among the various bacterial flora isolated, Bacillus was found to be the predominant genus followed by Pseudomonas. During storage at room temperature, the percentage of the bacterial genera such as Bacillus, Micrococcus and Flavobacterium decreased with simultaneous increase in Vibrio followed by Pseudomonas.

When the unprocessed whole fish stored at 4°C, bacterial genera recorded in the order of abundance were Pseudomonas, Bacillus, Vibrio, Flavobacterium and Micrococcus. Pseudomonas showed dominance over other genera and also increased significantly during storage with simultaneous reduction in Vibrio. Similar trend was observed with processed fillets during storage at ambient and refrigeration temperatures. Apart from the above mentioned genera, Corynebacterium and Aeromonas were also found. Presence of Aeromonas can be due to its indigenous nature as it was often reported to common pattern in aquatic animals. But the incidence of Corynebacterium sp. is rather unusual and probably it requires further analysis of aquatic habitat of the fish.
Number of isolates obtained from *C. carpio* fillets stored at room and refrigeration temperatures and preservatives treated fillets stored at 4°C were tested for hydrogen sulphide producer and various hydrolytic enzyme producers. Further the THB was examined for their hydrolytic potentials. All the fresh samples were found to possess maximum number of gelatinase and caseinase producers than amylolytic and lipolytics. During storage at 28°C, the proteolytic bacteria dominated over other isolates in all the samples. The percentage of occurrence of various hydrolytic enzyme producers was comparatively less in samples that were stored at 4°C than ambient temperature. However, fillets treated with preservatives showed least incidence of hydrolytic enzyme producing THB. Gelatinase producing bacteria showed dominance over caseinolytic, lipolytic and amylolytic bacteria both in treated and untreated fillets stored at 4°C. All the hydrolytic enzyme producers of samples increased with increase in storage period.

Hydrogen sulphide producing isolates showed significant increase from their initial level in all samples (treated and untreated fillets) during storage at both the temperatures. Among the untreated fillets, the percentage occurrence of H₂S producers was higher at 28°C than at 4°C.

Studies of organoleptic assessment indicated that the storage of unprocessed whole fish under refrigeration condition can extend the shelflife by three days compared to only six hours at room temperature. Untreated fillets stored at room and refrigeration temperatures were acceptable upto eight hours and eight days respectively. Among the fillets
dipped in various preservatives, sodium chloride did not prolong the shelf life, which is contrary to the traditional and conventional processing. However, dipping either in sodium acetate or the solution containing equal parts of sodium acetate and potassium sorbate had an extended shelf life of twelve days under refrigeration. Fillets dipped in potassium sorbate extended the shelf life to sixteen days under refrigeration. Reduction in protein content was minimum with potassium sorbate treated fillets than the untreated fillets and unprocessed whole fish stored at 4°C. There was slight rise in moisture content of potassium sorbate treated fillets, which seemed to have less influence on the shelf life of fillets.

Minimum total heterotrophic, psychrophilic and hydrogen sulphide producing bacterial counts were noticed in potassium sorbate dipped samples than untreated fish fillets. A significant reduction in hydrolytic enzyme and hydrogen sulphide producing bacterial isolates was also observed especially with potassium sorbate treated fillets. This investigation strongly recommends the use of Potassium sorbate at 2% (w/v) concentration to preserve fish fillets at refrigerated conditions.