On the Ice-storage Characteristics of *Catla catla* and *Labeo fimbriatus*

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The ice-storage characteristics of *Catla catla* and *Labeo fimbriatus* are reported. Muscle pH, moisture, total volatile nitrogen, alpha amino nitrogen and peroxide value and also the changes in total bacterial count are studied. *C. catla* and *L. fimbriatus* both could be stored in ice for 18 days.

For short time preservation of fresh fish icing has been the most widely practiced method. Although a comparehensive treatise is available on handling and transportation of marine fish (Bramsnaes, 1965. Farber, 1965) literature on freshwater fishes are limited. Bramstedt & Auerbach (1965) cited that our present knowledge in regard to freshwater fishes was poor when compared to that of sea fish. Studies on chilled freshwater fishes were done by Baliage *et al.* (1962a, b, 1963), Jafri *et al.* (1964), Khwaja (1966), Nair *et al.* (1971, 1974), Nair & Dani (1975), Gupta & Govindan (1975) and Bhattacharyya *et al.* (1978). Bandhyopadhyay *et al.* (1982) reported that ultimate ice storage lives of five species of commercially important fishes of the Hirakud Reservoir. In the present paper ice storage characteristics of the freshwater fish namely, *Catla catla* and *Labeo fibriatus* are reported.

Materials and Methods

Samples of *Catla catla* and *Labeo fimbriatus* were procured from ponds and Hirakud reservoir respectively. Fishes were iced within 4 to 6 h after catch. Nair *et al.* (1974) reported that a lapse of 7 h before icing has no adverse effect on storage life. The fishes were stored in crushed ice in wooden boxes having one inch thick expanded polystyrene insulation wrapped in 150 gauge high density polyethelene sheets. Reicing was done every day. Samples were drawn at intervals for biochemical, bacteriological and organoleptic analyses.

Moisture and peroxide value (PV) were estimated by the method of A.O.A.C. (1975). Fat was estimated by the method of Bligh & Dyer (1959) using chloroform as the solvent. Total volatile basic nitrogen (TVN) was determined by the microdiffusion technique of Conway (1947). Alpha amino nitrogen was estimated by the method of Pope & Stevens (1939). A 2:1 water: fish homogenate was used for measuring pH of the dorsal muscles using a pH meter. Total bacteria count (TBC) was determined by the standard pour plate method using peptone-glucose-agar (pH 7.2, incubated at $37° \pm 1°C$). Conditions of the eyes, gills, skin and muscle were considered while evaluating the organoleptic acceptability of the raw whole fish. Miyachi *et al.* (1964) was followed for the organoleptic evaluation of the cooked meat where the fish muscles were boiled in 2% common salt solutions for 5 minutes before subjecting them to the members of the taste-panel.

Results and Discussion

The biochemical, bacteriological and organoleptic changes have been reported on *C. catla* and *L. fimbriatus* both having an average weight of 500 g. The studies were conducted in January and December respectively. *C. catla* and *L. fimbriatus* had fat contents of 3.04% and 4.82% respectively.

Tables 1 and 2 show the changes in the parameters investigated. The pH, moisture, TVN and alpha amino nitrogen contents and PV increased from the initial values for both the fishes. Inspite of quite high PV, the organoleptic evaluators did not

Table 1. *Changes in C. catla under ice-storage*

Number of days in storage

	0	3	6	9	12	15	18
pH	6.85	6.90	6.90	6.80	6.95	6.95	7.00
Moisture % (w/w)	79.14	80.93	80.73	81.43	81.78	82.51	82.21
Total volatile nitrogen, mg/100g	8.19	8.63	9.53	11.20	12.03	12.23	13.55
Alpha amino nitrogen, mg/100g	21.11	24.00	25.01	26.69	27.24	28.86	33.41
Peroxide value milliequivalent-O_2/kg. fat	11.25	12.13	16.76	20.76	24.24	26.84	32.22
Total bacterial count/g	3.40×10^4	3.13×10^3	8.52×10^2	4.56×10^3	—	1.69×10^5	6.70×10^5
Organoleptic score Raw whole fish	10	7.0	6.8	5.4	Below 5	—	—
Cooked meat	10	8.5	8.5	7.5	7.0	6.0	5.0

Table 2. *Changes in L. fimbriatus under ice-storage*

Number of days in storage

	0	3	6	9	12	15	18
pH	6.65	6.65	6.65	6.75	6.90	7.10	7.10
Mositure % (w/w)	75.4	76.82	76.44	78.01	79.26	81.25	82.62
Total volatile nitrogen mg/100g	6.06	8.68	9.84	10.42	10.61	12.91	15.65
Alpha amino nitrogen mg/100g	17.48	26.75	31.17	34.26	36.65	42.37	53.61
Peroxide value milliequivalent-O_2/kg. fat	30.26	36.54	49.52	59.26	96.21	140.8	156.4
Total bacterial count/g	2.23×10^4	1.07×10^4	6.31×10^3	8.94×10^3	1.15×10^4	2.07×10^5	2.94×10^5
Organoleptic score Raw whole fish	10	7.3	6.8	5.0	below 5	—	—
Cooked meat	10	8.7	8.0	7.5	6.4	5.5	5.0

report any rancidity possibly because of the nature of the fat contents. There were initial reductions in TCB which later increased and eventually surpassed the original counts. Similar observations were made by the authors for 5 more fishes (Bandhyopadhyay *et al.* 1982). Initial reductions in TBC were due to leaching and cold shock, after which psychrophiles dominated.

The muscle pH for both the fishes increased from their initial values showing cyclic changes. Like other fishes, therefore, pH cannot be considered as an index of freshness for these two fishes as well.

It was observed that the first distinct physical changes occur after 3 and 4 days for *C. catla* and *L. fimbriatus* respectively when ice stored. Both are acceptable for 9 days in terms of organoleptic qualities of raw whole fish and 18 days in terms of organoleptic qualities of their cooked meats.

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