



**CHANGES IN BIOCHEMICAL COMPOSITION OF SINGARAH (*Mystus* sp.)
AFTER PRESERVING WITH LOW FIRE BURNT PROCESS****BASUMATARI D^{1*} AND SHARMA R²****1:** Assistant Professor, Dept. of Zoology, Cotton University, Guwahati, Assam-781001, India**2:** Research Scholar, Dept. of Zoology, Cotton University, Guwahati, Assam-781001, India***Corresponding Author: Dr. Devajit Basumatari: E Mail: devajitbasu@yahoo.in****Received 25th Nov. 2020; Revised 29th Dec. 2020; Accepted 10th Jan. 2021; Available online 1st Oct. 2021**<https://doi.org/10.31032/IJBPAS/2021/10.10.5663>**ABSTRACT**

Fish plays an important role in human nutrition health. It is a valuable source of protein, minerals, vitamins like A, B, D and fatty acids. Singarah (*Mystus* sp.) belongs to group catfish is found available in the river Brahmaputra and its tributaries is a very popular having highly demand among the consumers. There are many methods available nowadays for the preservation of fishes. There are also some local methods, fully scientific use by the indigenous people of N.E. of India. Burning of fish in low fire is such a local process of preservation. In the study, freshwater catfish, of genus *Mystus* like *Mystustengara*, *Mystus vittatus*, *Mystusca vasius* are burnt and observation was done on proximate composition and microbial load from fresh and burnt samples.

Key words: *Mystus* species, Preservation, Post-preservation quality, Proximate composition, Microbial load

INTRODUCTION

The Indian fish population represents 11.72% of species, 23.9% of genera, 57% of families and 80% of the global fishes. The habitats that contribute to rich fisheries resources are in the form of rivers, floodplain wetlands (beels), swamps and low-lying paddy fields. These vast and

varied aquatic resources support a rich variety of freshwater fishes. A total of 202 fish species has been reported from Assam (U.C. Goswami *et al.*, 2012) [1]. Indian fisheries and aquaculture are important sectors of food production.

Fish are known to be a very healthy food item. They are an excellent source of protein, various minerals and nutrients necessary for good health.

Due to high content of polyunsaturated fatty acid, fish flesh and fish oil are beneficial in reducing the serum cholesterol (Stansby, 1985; Graikoski, 1973) [2, 3]. Fish meat/flesh also contains a special type of fatty acid, Omega-3 polyunsaturated fatty acid, which prevents a number of coronary heart diseases. Fish proteins also contain all the essential amino acids, hence have a high nutritional value, which contribute to their high biological value.

Preservation and processing invariably bring about some changes, most of them irreversible, in the intrinsic characteristic of the fish. It is fact that consumers always prefer fresh fish to preserved fish. The lack of preference for preserved or processed fish is attributed, to some extent to the changes in the appearance, color, texture, taste and flavor accompanying the processing involved. The main factors responsible for the decomposition of fresh fishes are bacterial activity and oxidative rancidity (Tarr, 1956a; Sharma, 2012) [4, 5]. The denaturation of protein is because of the presence of an enzyme which transforms trimethylamine oxide to dimethylamine and formaldehyde in tissues and thus increases the rate of protein

denaturation. After death, the lipids in fish undergo two major changes, namely lipolysis and auto-oxidation. The effects produced by these changes are considered undesirable and often the major causes of spoilage.

The degree of spoilage depends on factors like the sum of attributes inherent in the muscle of fish. There are also some external factors which directly involved in spoilage are way of handling, temperature, maintenance of hygiene, etc. A number of techniques are seen for its preservation, which includes scientific and industrial preservation methods and also some conventional method which are generally used by some ethnic communities of Assam and NE region of India. Though the domestic or manual preservation does not follow any kind of scientific methods, the quality of the preserved fishes is high with standard food value and also hygienic. Burning techniques of preservation is found in the districts of Morigaon and Nagaon, parts of Karbi Anglong hill areas. Generally, fishes like *Mystus tengara*, *Mystus vittatus* and *Mystus cavasius* are used for this purpose. *Channa* sp., *Anabas* sp. and Carps are also used.

MATERIALS AND METHODS

Mystus species such as *Mystus tengara*, *Mystus vittatus*, *Mystus cavasius* are collected from the markets of Greater

Guwahati. Both fresh and burnt samples of species are collected from time to time and species were evaluated organoleptically for appearance, texture, odour and flavor of raw fish. The scoring is done on a reference scale (10-0) based on odour and appearance, adopted from Miyanchi *et al* (1964) [6]. Different proximate composition parameters are also estimated. By using AOAC (2016) moisture content was estimated. Total protein content was estimated by Kjeldahl method AOAC (2012) [7]. By the help of AOAC (2016) [7], the ash content was measured. The Soxhlet apparatus (AOAC, 2012) [7], was used for determination of fat content of moisture free sample. The microbiological characteristics was assessed by using the standard method of APHA (Speak, 1984; Vishwanath, 1998; Basti, 2006; Anihouvi, 2007) [8-11].

RESULTS AND DISCUSSION

The conditions of freshness of the fish are evaluated by simple organoleptic ways in view of the importance of these fishes. Anderson (1908) [12] described the various criteria annotated with freshness of fish such as skins, condition of the eyes, texture of the fish, odour and appearance of the abdominal fluid. Stansby (1945) [2] also studied the problem of the organoleptic evaluation of fish. The quality of evaluation of *Mystus* species has been studied for 3

years. It has been found that 20-25% are of excellent grade (10 & 9), 60-65% comprises grades (8-7), (6-5), (4-3), only 5-10% of the fishes are unfit for consumption (2-0). The **Table 1** shows the grades of the quality of fish species.

Collected fishes from market were cleaned and steaks were prepared. The proximate composition was estimated by already described methods. The fresh pieces of fishes were burnt and preserved at normal and room temperature. The results are shown in **Table 2**. It was found that burnt preserved samples contain less moisture and less lipid content. It was also found that in case of total protein and ash there are significant changes.

In the present study, the microbial load was determined by APHA (Speak, 1984; Vishwanath, 1998; Basti, 2006; Anihouvi, 2007) [8-11]. No attempt has been made to identify bacterial prompt. The total microbial load found in fresh and freshly burnt preserved samples (n=10) are compared with the fresh fish samples (n=10). As samples, skin surface and muscle were taken and examined. It was found that in the preserved samples there is an arrest in the growth of microbial load. The skin surface of fish species showed the maximum load in fresh and burnt fishes. The results are shown in **Table 3**.

Table 1: Organoleptic evaluation of different *Mystus* species

Species	Score	Grade	% of occurrence
<i>Mystus cavasius</i>	10-9	Excellent	25.4%
	8-7, 6-5	Moderate	66.1%
	4-3, 2-0	Unfit	08.5%
<i>Mystus vittatus</i>	10-9	Excellent	24.3%
	8-7, 6-5	Moderate	66.5%
	4-3, 2-0	Unfit	09.2%
<i>Mystus tengara</i>	10-9	Excellent	24.4%
	8-7, 6-5	Moderate	66.2%
	4-3, 2-0	Unfit	09.4%

Table 2: Quality changes of proximate composition in different conditions

Parameters	Species	Fresh fish	Changes of burnt fish*	Changes of burnt fish†
Moistures	<i>Mystus cavasius</i>	72 ± 1.5	50 ± 1.5	1.2 ± 0.2
	<i>Mystus vittatus</i>	71 ± 1.5	51 ± 1.5	1.0 ± 0.2
	<i>Mystus tengara</i>	73 ± 0.5	51 ± 0.5	1.2 ± 0.2
Protein	<i>Mystus cavasius</i>	15.5 ± 0.5	16.0 ± 1.0	15.5 ± 1.5
	<i>Mystus vittatus</i>	15.0 ± 0.5	16.5 ± 0.5	16.2 ± 0.5
	<i>Mystus tengara</i>	16.0 ± 0.5	17.2 ± 0.5	17.0 ± 1.5
Fat	<i>Mystus cavasius</i>	3.5 ± 0.5	2.5 ± 1.5	3.0 ± 0.5
	<i>Mystus vittatus</i>	4.0 ± 0.2	3.0 ± 1.5	2.0 ± 1.5
	<i>Mystus tengara</i>	4.5 ± 0.2	4.0 ± 0.5	3.5 ± 1.5
Ash	<i>Mystus cavasius</i>	72 ± 1.5	1.5 ± 0.4	1.2 ± 0.2
	<i>Mystus vittatus</i>	71 ± 1.5	1.2 ± 0.2	1.0 ± 0.2
	<i>Mystus tengara</i>	73 ± 0.5	1.2 ± 0.2	1.2 ± 0.2

*at room temperature; †during storage for 7 days at room temp.

Table 3: Microbial load in fresh and different conditions

Species	Fresh fish	Changes of burnt fish	Changes of burnt fish	
<i>Mystus cavasius</i>	Skin	2.5x10 ⁴ (±0.5x10 ⁻⁴)	1.5x10 ⁴ (±0.5x10 ⁻⁴)	2.0x10 ⁴ (±0.5x10 ⁻⁴)
	Muscles	2.0x10 ⁴ (±0.5x10 ⁻⁴)	2.0x10 ⁴ (±0.5x10 ⁻⁴)	2.5x10 ⁴ (±0.5x10 ⁻⁴)
<i>Mystus vittatus</i>	Skin	2.0x10 ⁴ (±0.5x10 ⁻⁴)	1.4x10 ⁴ (±0.5x10 ⁻⁴)	1.4x10 ⁴ (±0.5x10 ⁻⁴)
	Muscles	2.2x10 ⁴ (±0.5x10 ⁻⁴)	2.0x10 ⁴ (±0.5x10 ⁻⁴)	2.3x10 ⁴ (±0.5x10 ⁻⁴)
<i>Mystus tengara</i>	Skin	2.2x10 ⁴ (±0.5x10 ⁻⁴)	1.1x10 ⁴ (±0.5x10 ⁻⁴)	1.5x10 ⁴ (±0.5x10 ⁻⁴)
	Muscles	2.5x10 ⁴ (±0.5x10 ⁻⁴)	2.2x10 ⁴ (±0.5x10 ⁻⁴)	2.4x10 ⁴ (±0.5x10 ⁻⁴)

*at room temperature; †during storage for 7 days at room temp.

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