



Analysis of Proximate Composition of *Tenulosa Ilisha* (Clupeiformes: Clupeidae) in Narmada River, Gujarat

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Abstract

In the present study, the proximate biochemical compositions of *Tenulosa ilisha* (Hilsa, Shad) have been analysed. Hilsa, a species related to Clupeidae family is an anadromous fish migrating from the Persian Gulf along the Indian Subcontinent up to Bangladesh have been found majorly inhabiting the waters of Narmada River of Gujarat normally inhabiting the lower region of the estuarine and foreshore areas during the monsoon for breeding. The analysis of protein, ash, fat and moisture content were done in relation to different body weight groups of Hilsa. Samples were collected from major landing stations of Narmada River, viz., Jageshwar, Ambetha, Vegni, Bhadbhut and Hansot villages of Bharuch district. The protein content in females in pre-monsoon was found to be higher than the males. The samples processed for protein and fat in post monsoon period were found to be vice versa for the fact that the females had relatively utilised it during the spawning and breeding period. Similarly, the ash and moisture content have also showed profound changes in tissue samples processed during pre- and post-monsoon period for both males and females.

Keywords

Tenulosa ilisha, proximate analysis, Narmada River, Gujarat.

INTRODUCTION

Hilsa (*Tenulosa ilisha*), a species related to Clupeidae family is an anadromous fish migrating from the Persian Gulf along the Indian Subcontinent up to Bangladesh have been found majorly inhabiting the waters of Narmada River of Gujarat normally inhabiting the lower region of the estuarine and foreshore areas during the monsoon for breeding. The Hilsa shad is to a great extent an anadromous species, however two different ecotypes, a fluvial

potamodromous type and a marine kind have been perceived [1][2][3][4][5]. The potamodromous stocks seem to stay in the centre scopes of the streams consistently and breed in that. The anadromous stocks, whose typical living space is the lower locale of the estuaries and the foreshore zones, climb the waterways amid the reproducing season and come back to the first natural surroundings subsequent to bringing forth [6]. The upstream movement amid the principle rearing

season depends to a great extent on the beginning of the south-west rainstorm and subsequent flooding of the significant waterways of India, Bangladesh and Burma [3]. It has been set up that the data on the substance synthesis of fish in regard to the nutritive esteem is essential to contrast and other wellspring of creature protein, meat and poultry items [7]. There are a couple of reports on the nutritive estimations of Hilsa. Hilsa is a transitory fish and it voyages a large number of kilometers from upstream of stream to mid sea. Various locales of the Narmada River and the mouth of the River contains various kinds of nourishment (phyto- and zooplankton)[8]. Different types of food make proximate composition a bit different and also different part of the body makes the composition different as well. Biochemical composition of fish flesh may vary within the same species of fish depending upon the fishing season, age, sex and habitat [9][10][11]. The variation is also found within the different region of the body. In fishes, proximate composition means the composition of the fish flesh. Fish flesh contains four basic ingredients in varying proportions major nutrients such as water (70 - 80%), protein (18 - 20%), fat (5%) and minerals (5%) and minor nutrients such as vitamin, carbohydrate. It has high nutritional value in terms of fats and proteins that are not commonly available in other foods. The present study details with the proximate analysis of protein, fat, moisture and ash content in Hilsa.

The fresh fishes were collected from major landing stations of Narmada River, viz., Jageshwar, Ambetha, Vegni and Hansot (21°34'54.50" N and 72°48'24.80"E) Bhadbhut (21°40'54.29"N and 72°50'42.28"E) (Fig. 1) as the primary landing centres/villages of Bharuch district in the monsoon concerning on the main focus on seasonal variation for its anadromous behaviour. Fishes were collected in early evening as soon as they arrive from fishing and after collection fish samples were taken in ice box and were transferred to laboratory of Department of Science, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara for analysis. After washing with tap water and taking length and weight of the fishes, the sample fish were frozen at -20°C until laboratory process. The samples were dissected out and the muscle tissues for the study were taken from the caudal region. The study is currently going on for the other regions as well so that the proximate content as per body difference can be ascertained. The proximate composition of fish was determined by conventional methods of Association of Official Analytical Chemicals [12] on weight basis.

At the beginning, initial weight of the sample (W1) was taken. The collected samples were dried in an oven at about 105°C for about 3 hours and were transferred to desiccator to cool down. Thereafter the weight of the sample (W2) was taken again. The moisture content was calculated using the following equation: Moisture (%) = $(W1 - W2) \times 100 / W1$ [12].

MATERIALS AND METHODS

Fig 1. Moisture content (%) variation for male and female Hilsa collected from different places. The range of moisture content (%) for male specimen ranged from 37.2 – 64.1% while for the female range starts from 49.4 – 72.5%.

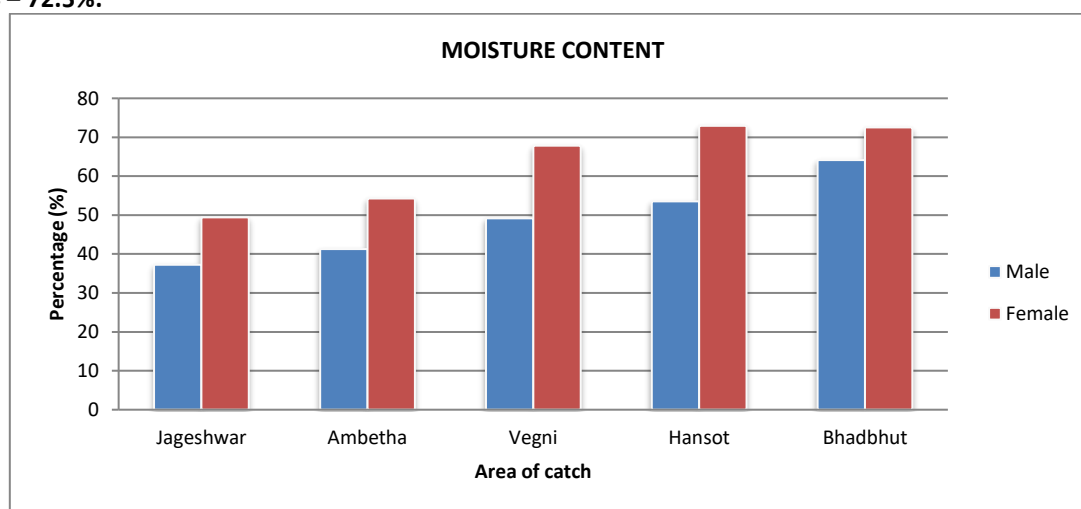


Fig 2. Ash content (%) variation for male and female Hilsa collected from different places. The range of ash content (%) for male specimen ranged from 0.8 – 1.33% while for the female range starts from 0.9 – 1.16%.

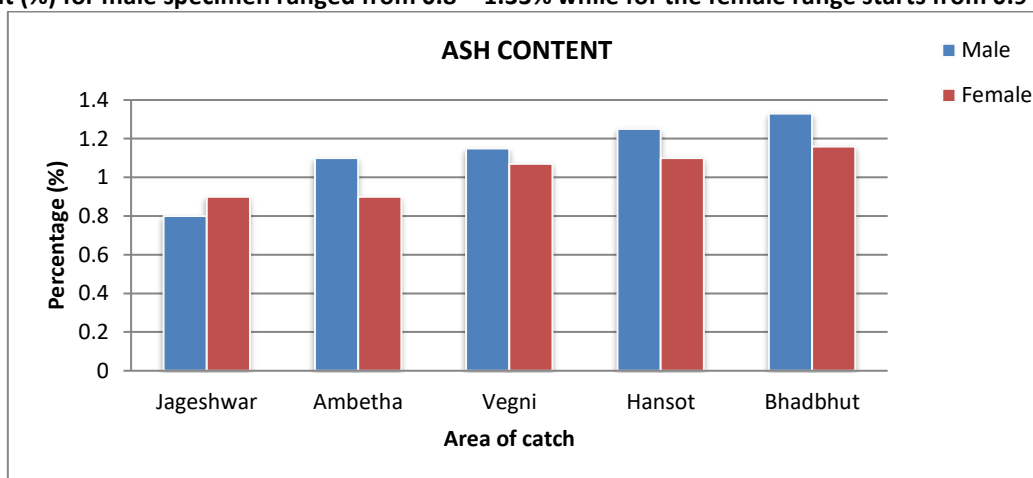


Fig 3. Protein content (%) variation for male and female Hilsa collected from different places. The range of protein content (%) for male specimen ranged from 29.5 – 41% while for the female range starts from 33.2 – 49.5%.

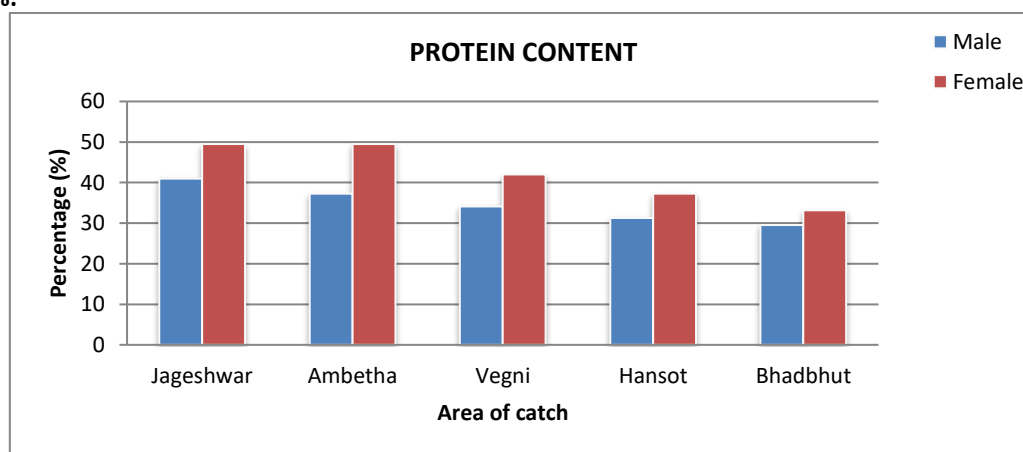
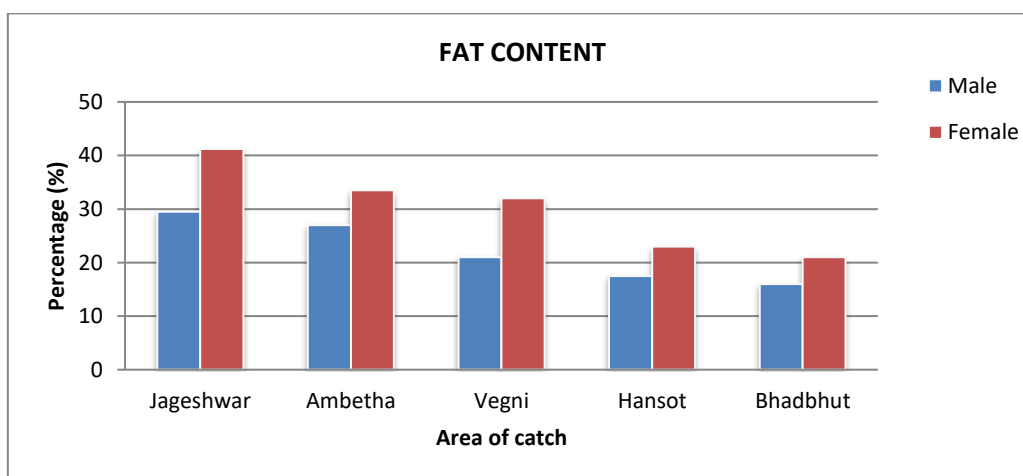


Table 4. Fat content (%) variation for male and female Hilsa collected from different places. The range of fat content (%) for male specimen ranged from 16 – 29.5% while for the female range starts from 21. – 41.2%.



The protein content of the fish was determined by micro kjeldahl method. It involves conversion of organic nitrogen to ammonium sulphate by digestion with concentrated sulphuric acid in a microkjeldahl flask [12].

For the estimation of fat content, the dried samples left after moisture determination were finely grinded and the fat was extracted with a nonpolar solvent, ethyl ether. After extraction, the solvent was evaporated, and the extracted materials were weighed [12].

The ash content of a sample is the residue left after ashing in a furnace at about 550 - 600°C till the residue became white [12].

RESULTS AND DISCUSSIONS

The analysis of the samples for moisture, ash, protein and fat for the muscle tissues were carried out and the results obtained have been represented graphically with reference to male and female hilsa caught during the monsoon season while travelling into the freshwaters of Narmada River for spawning activity.

The results obtained from the studies showed the highest percentage (%) of moisture from the muscles of the samples. The sampling from Vegni, Hansot and Bhadbhut within an area of 50 kms, showed very less variation for moisture (Table 1). Similar results were obtained for ash content from the same areas showing insignificant variation. However, there was very much variation of data available in Protein (Table 3) and Fat (Table 4) content of the fishes with respect to the sampling areas. The male and female population ratio was also found to decreasing with the migration into the freshwater. Jageshwar, a majorly marine site from which samples showed the highest protein and fat content of 29.5%M, 33.2%F and 29.5%M, 41.2%F respectively. While the fish at Bhadbhut, the endmost landing centre witnessing hilsa migration and with more of freshwater regime showed 29.5%M, 33.2%F protein content and 16%M, 21%F fat composition. Similarly, the ash content (Table 2) also showed variation with respect to the inward migration, fish caught at Bhadbhut showed maximum ash content.

According to Stansby (1954) and Jacquot (1961), variation in proximate composition of fish flesh may vary with species variation, season, age and the feeding habit of fish. The chemical composition of flesh may vary largely between and within species [13].

CONCLUSION

There were numerous conceivable factors, for example, measure, sex, development of tests that can influence the contrasts in proximate analysis of fishes. Examining strategies additionally assumed critical job in the distinctions of the discoveries. One of conceivable components was the representativeness of the examples. Unique approach of inspecting methods, which included the technique for sample gathering, distinctive example accumulation locales, and distinction in the incorporation criteria of samples with different past examinations, clarified the slight contrast in the proximate analysis. There was likewise sure data in past examinations that was lacking to be utilized for examination with the present investigation. Thus, it is hopeful that details on the sampling procedures and methods of analysis used in this study will be able to provide sufficient information for any comparative purposes in the future.

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