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Estimation of proximate composition (moisture and ash content) of some economically important fishes of the valley

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I INTRODUCTION

Kashmir waters form important fish habitat, the fish found here make up a significant part of diet for many thousands of people living here in Kashmir valley. The main species are the common carp, rosy barb, mosquito fish, nemacheilus species and other species especially snow trout. The snow trout include *Schizothorax longipinus*, *Schizothorax labiatus* , *Schizothorax curvifrons, Schizothorax plagiostomus, Schizothorax niger*, *Schizothorax esocinus* and these contribute about 60 percent of total fish in Kashmir . The world's demand for aquatic source of foods is on the rise not only because of its growing population, but also because of preference for healthier foods for human beings [1]. Over 800 million people in the world are chronically malnourished as per the united nation;s statistics. To ensure nutritional security, increased availability of diverse types of foods of animal origin such as milk, meat and fish besides cereals are essential. Fishes are also a valuable source of vitamin A and D. Fatty fishes in Kashmir are a prime source of vitamin D. All fishes contain several of the B complex vitamins. It is also a top source of minerals too. In addition to proteins, vitamins and minerals, fish oils contain polyunsaturated fats. Inspite of high preferences for fish and fishery products, the per-capita consumption of fish in India is still very low. Globally, fish and shellfish account for about 16 % of animal protein consumed [2]. In somecountries figure is as high as 50%. Protein content of raw fish flesh is 18-22%. Therefore, aquatic food can in some ways be the medical food of 21st century. Fish is an excellent source of protein and other elements for the maintenance of healthy body [3]. In addition, it is very good source of polyunsaturated fatty acid (PUFA). An increasing amount of evidence suggests that due to its high content of PUFA fish flesh and fish oil are beneficial in reducing the serum cholesterol [4].

Moisture, protein, fat and ash are the main components of fish meat and the analysis of th same is referred to as ' proximate composition' [5]. Like any other meat, the moisture, protein, fat and ash (mainly minerals) constitute the

four basic constituents of fish meat. Carbohydrates and non- protein compounds are also important constituents but are present in small amounts and are usually ignored during analysis [6]. The live weight of majority of fish usually consists of about 70-80% moisture, 20-30% protein and 2-12% fat [6]. However these values may vary considerably within and between species and also with siz, sex, feeding, season and physical conditions. The distribution of these substances among the various organs and tissues of body may also show considerable differences [7].

Generally the proximate composition is traditionally used as an indicator of nutritional value of food materials [8] and it has also been reported that the principal components of fish are moisture, protein, fat, ash and minute quantities of carbohydrates [9]. In short, Proximate composition is the moisture, protein, fat and ash contents of the fishes. Therefore, the precise information about these biochemical constituents of fishes are necessary for the formulation of animal feed, fish feed, fish industry, human health, nutritionists, pharmaceuticals, chemists etc. The percentage of moisture in the composition of fish is a good indicator of the relative energy, fat and protein contents [10 , 11]. Determining the relative amount of moisture content in fish, one can obtain relative estimates of energy and fat contents [12, 13].

II Materials and methods

The live fishes were brought from local fish market and stocked in the wet laboratory at the department of Zoology, University of Kashmir, Srinagar for about 72 hours. They were acclimatized in the laboratory condition to avoid physiological stress during transportation. After fully acclimatization in laboratory these fishes were scarified for analysis.

2.1 Determination of moisture

For determination of total moisture content of the whole body of fish, the viscera, fins and tail were removed from the body of the fish and then the eatable portion of the fish was divided into several parts for making three-four uniform samples from all the parts of fish. The wet samples were put in the pre- weight dry petridishes and then weighted again. The petridishes with wet samples were kept in digital hot air oven for drying at 105 for about 24 hours or until the constant weight was obtained. Then dry samples were taken out from oven and put in desiccators, after 30 minutes the weight was taken, the difference in weight (wet and dry sample) was calculated and expressed as percentage moisture content of the sample. The percentage of the moisture content was calculated by using the following formulae:

Moisture = Wet weight of sample (g) / Dry weight of sample (g)/ Wet weight of sample ×100

2.2 Determination of Ash content

The moisture free dried fish samples were grinded and finely powdered with the help of mortar and pestle for converting samples into fine powder which was used for the analysis of other parameters such as ash content.

The fine powdered moisture free samples were taken in clean pre-weighted silica crucibles and weighted again along with samples.

The crucibles containing samples was then placed in a muffle furnace at 65 c for about 4-6 hours or till the residue became completely white.

The samples were then allowed to cool in desiccators for about 20-30 minutes, reweighted and the amount of ash was calculated as the difference in weight. The percentage of ash was obtained by using the following formula:

Total ash = Weight of ash (g)/ Weight of sample (g) × 100

III FIGURES AND TABLES

Fig. 1 Specmen obtained from Dal Lake for current study

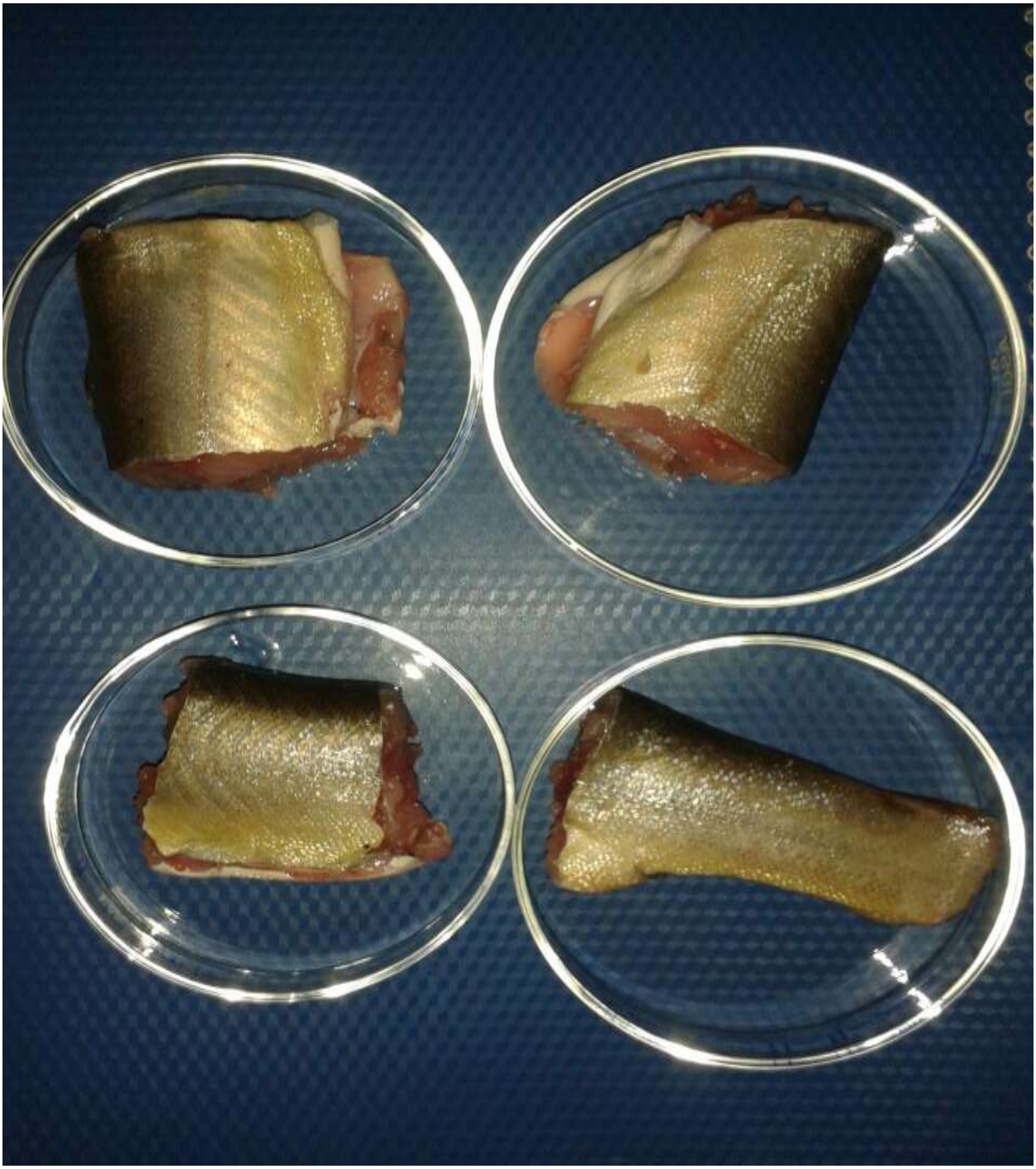

Fig. 2 Wet Sample

Fig. 3 Sample before ashing **Fig. 4 Sample after ashing**

IV RESULTS

The two major components of fish biochemical composition i,e. moisture and ash content of three selected important food fishes of the valley has been determined in the present study and the results are presented in the form of graph. Significantly ($P < 0.05$) lowest moisture content (77.68 ± 3.10) was reported in *Cyprinus carpio specularis.* While no significant ($P > 0.05$) difference in moisture content was reported among the remaining two species *Cyprinus carpio communis* and *Schizothorax labiatus*, both species showed overall higher moisture contents, however a numerically lower value of body moisture content (79.26 ± 0.29) was recorded in *Schizothorax labiatus* when compared to *Cyprinus carpio communis* (79.78 ± 0.83). The body ash content also produced significant differences among each fish species with highest body ash content (16.47 ± 1.50) was recorded in *C. carpio specularis* followed by *C. carpio communis (14.79 ± 0 .83).* Whereas significantly *($P < 0.05$)* lowest body ash content (12.62± 0.53) was registered in *S. labiatus* in the present study. The data was presented in mean values of three samples and SD. The results of the present study would be useful for further quantitative analysis of nutrient content in the flesh of the above selected food fishes for the benefit of human beings.

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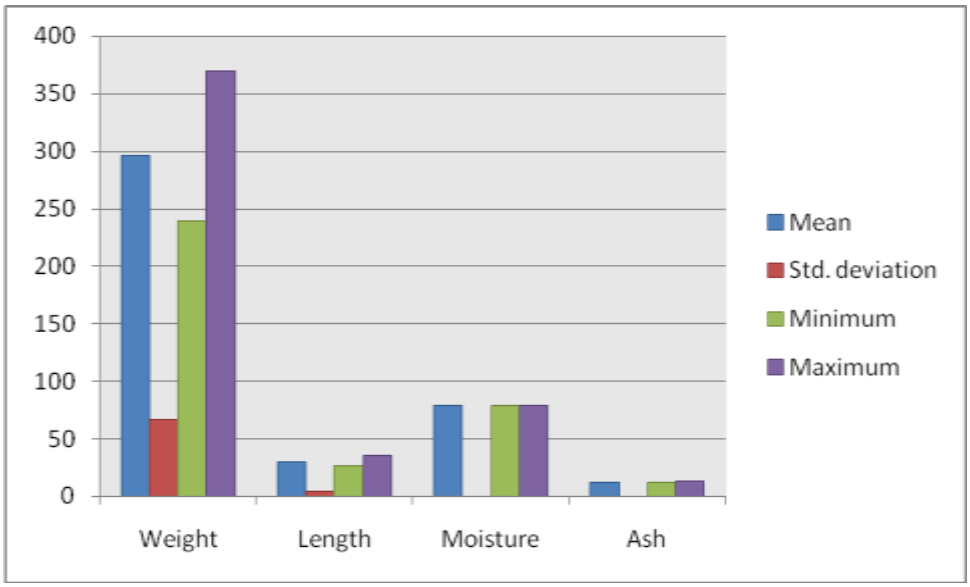

Chart showing moisture and ash content of *Schizothorax labiatus*

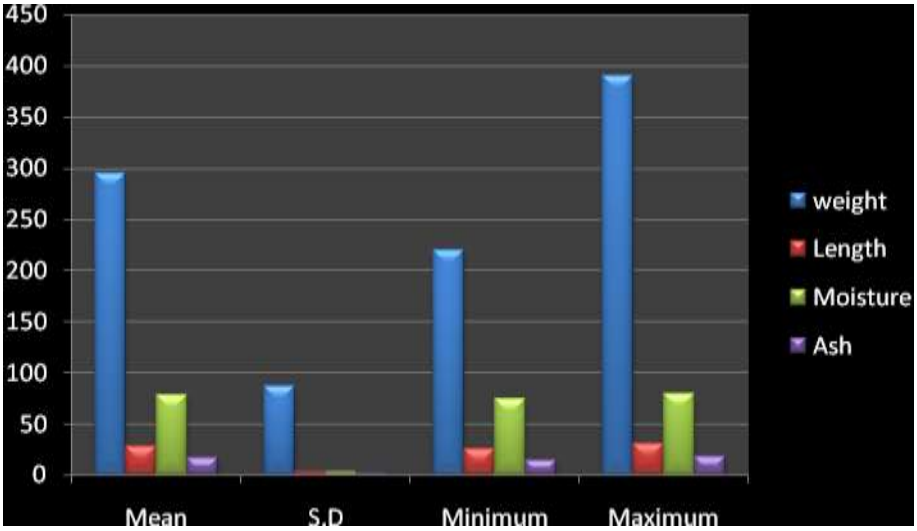

Chart showing moisture and content of *Cyprinus carpio communis*

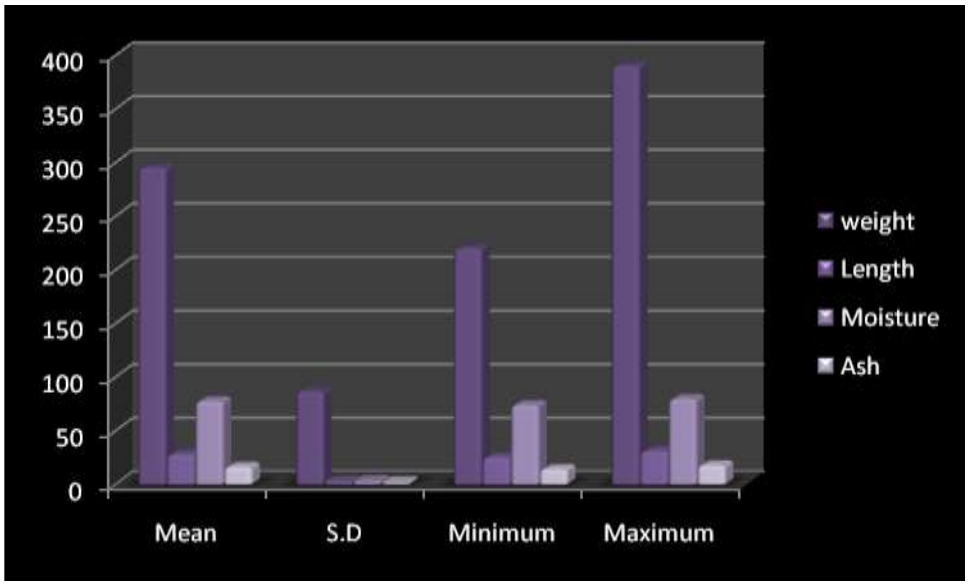

Chart showing moisture and ash content of *Cyprinus carpio specularis*

V DISCUSSION

In the present study all the three fish species showed variation in their two major body constituents i,e. moisture and ash. Although the moisture contents did not showed too much difference among the three species but *C. carpio* showed statistically and significantly higher moisture content among all the species. The overall results related to the moisture content of various fish species obtained in the present study is in accordance with the findings of other workers[14].The variation in the body ash content of these fish species may be attributed with the health condition and the availability of food in their respective feeding environment. Similarly the variation in moisture content among fish species is greatly dependent upon the quantity of fat in the body which could also be related to the feed availability of the fish.

VI CONCLUSION

In general, the biochemical composition of the whole body indicates the fish quality. Therefore, knowledge on biochemical composition of fish finds application in several areas. Due to an ever-increasing awareness about health foods and fish is finding more acceptances because of its special nutritional qualities. Therefore proper data on biochemical composition is not only essential for nutritionists for the purpose of formulating fish feed for animals, but also for the purpose of processing and preservation of fish and fishery products for their export and other important means for human food , medicine and for industries.

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