Comparative Study Of Moisture Content In Some Commercially Important Food Fishes Of The Kashmir Valley

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Abstract:

Fish is considered one of the best sources of animal protein among food animals because of its high nutritional value and palatability. Owing to its importance as a food commodity, the assessment of the biochemical composition of different fish species, sizes, body regions, and their variations is of considerable significance. The present study aimed to comparatively assess the moisture content of six commercially important food fishes of the Kashmir Valley. Live specimens were collected during the early morning hours in collaboration with local fishermen and transported to the Fish Nutrition Research Laboratory, Department of Zoology, University of Kashmir. The length and weight of each fish were recorded prior to processing. The fishes were then dissected, and the internal organs, head, and other non-edible portions were removed. Samples were collected from different body regions, including anterior dorsal (AD) and anterior ventral (AV) regions, for the estimation of moisture content. Among the samples analysed, the highest moisture content was recorded in Schizothorax plagiostomus, with the anterior ventral (AV) region showing a value of 82.44%, whereas the lowest moisture content was recorded in Schizothorax esocinus, with a value of 74.23% in the anterior dorsal (AD) region. Overall, ventral samples exhibited slightly higher moisture content than dorsal samples in both species. The findings demonstrate variation in moisture composition among fish species and body regions, which may have implications for their nutritional quality and food value.

Keywords: Biochemical composition, food fish, moisturize content, Dal Lake

INTRODUCTION

Aquaculture now supplies a substantial share of the world's aquatic food. Expansion has brought denser stocking,

It's estimated that there are 50000 species of fishes living today. They are amongst the earliest vertebrates going back to Devonian period the age of fishes, about 400 million years ago. Some of the fishes live exclusively in fresh water, other are marine and while as others prefer brackish waters.

The nutritive and medicinal value of fish has been recognized from time immemorial. Fresh fish provides an excellent source of protein for human diet. This protein is relatively of high digestibility. Nutritional studies have proved that fish protein ranks in the same class as chicken protein and are superior to milk, beef protein and egg albumin. Fish protein comprises all the ten essential amino acids in the desirable strength for human consumption, namely lysine (higher in concentration), arginine, histidine, leucine, isoleucine, valine, threonine, methionine, phenylalanine and tryptophan. This accounts for the high biological value of fish flesh. Fish flesh therefore becomes a valuable supplement to human diet for people who are habitually taking cereals, starchy roots and sugar as their principal diet. Besides, proteins, fish flesh also offers minerals, iodine, vitamins and fat.

According to FAO (2005) of the United Nation about 2000 million people annually fail to get the minimum requirement of 30 gm protein per day and nearly three million people die due to protein malnutrition. In recent years fish has became favorite food stuff for the majority of societies because of several health reasons. It is much sought after by a broad cross-section of the world's population, particularly in developing countries. It is estimated that around 60 percent of people in many developing countries depend on fish for over 30 percent of their animal protein supplies, while almost 80 percent in most developed countries obtain less than 20 percent of their animal protein from fish. However, with the increased awareness of the health benefits of eating fish and the ensuing rise in fish prices, these figures are rapidly changing. Being an excellent protein content, fish also contains significant amounts of all essential amino acids, particularly lysine in which cereals are relatively poor. Fish protein can be used therefore to complement the amino acid pattern and improve the overall protein quality of a mixed diet.

All though the main body constituents of the fish include water, lipid, ash and protein. However, carbohydrates and non-protein compounds are also important constituents but are present in small amounts and are usually ignored during analysis (Love, 1980; Cui & Wootton, 1988; Wootton, 1990). Proximate body composition is the analysis of water, fat, protein and ash contents of fish (Love, 1970). The percentage of water is good indicator of its relative contents of energy, proteins and lipids. The lower the percentage of water, greater the lipids and protein contents and higher the energy density of the fish (Dempson et al., 2004). It means determining the relative amount of water in the fish one can obtainrelative estimates of the energy, fat and lipid contents (Salam et al., 1993; Salam & Davies, 1994; Jonsson & Jonsson, 1998). There exist in inverses relationship between the water content and lipid content of fish, such that the sum of the percentage of the two approximates 80%. Forther, the summation of oil and water, however, is not necessarily constant and frequently spans a range of 78-85% (Stansby, 1961).The four major constituents in the edible portion of fish are water, protein, lipids, ash. The anaysis of these four basic constituents of fish muscle is often referred to as 'proximate analysis or biochemical composition (Love, 1970).

MATERIALS AND METHODS

The various apparatus required to determine the moisture content of fishes included.

1. Wax tray
2. Small glass petridishes
3. Knives
4. Balance
5. Cotton cloth
6. Dessicator
7. Oven

SITE OF COLLECTION

Dal Lake
Location:34° 06'N & 74° 45'E, east of Srinagar city
Max length= 7.44 km
Catchment Area 316 http://sq.km
max width= 3.5 km
Surface area = 18.22 http://sq.km
Altitude – 1587 m above sea level
average depth= 1.42 mts
Lake type – warm, monomictic (Plate 1).
Dal Lake have been the centre of Kashmiri civilization and is one of its most beautiful natural resources.
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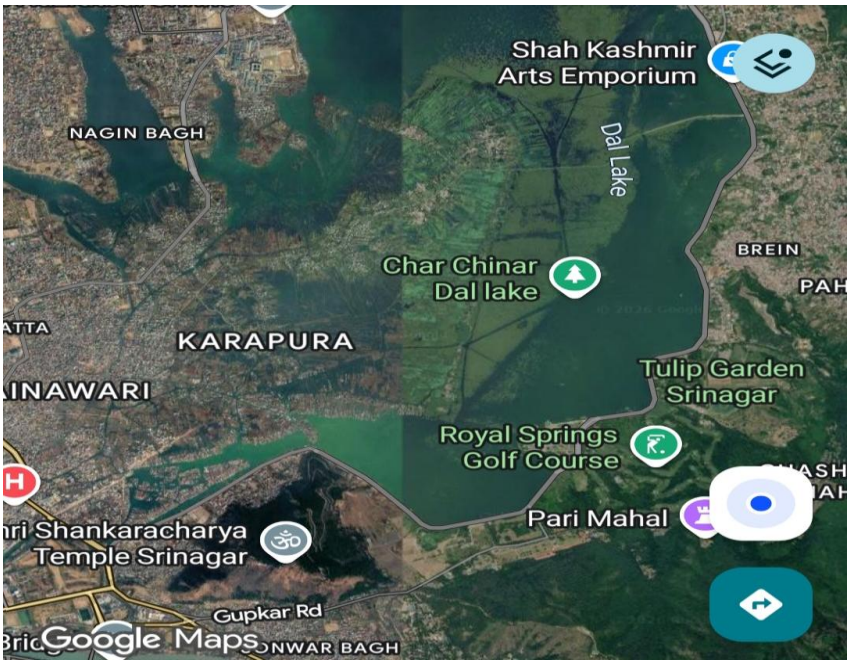

Plate 1: Map of Dal Lake (Courtesy Google maps)

This shallow post glacial water body is bounded on the South-West and west by Srinagar city, and its remaining sides are surrounded by gentle terraced slopes at the base of precipitous mountains. Two beautiful man-made islands the Sona Lank and the Ropa Lank are located within the lake.

The Dal lies in the flood plain of the Jhelum river, whose broad meanders have cut swampy low lands out of the Karew a

terraces. The lake is divisible into four distinct basins Hazratbal, Lokut dal, Gagribal and Nageen. The lake receives water from the Dagwan Nallah which joins it at Tail bal. the excess water is drained out into river Jhelum through the is drained out into river Jhelum through the Tsuntikol which leaves from Gagribal basin at Dalgate. The Nageen basin is connected with the Kushalsar lake through the Nallah Amir Khan. The main catch of Dal includes: Schizothorax niger, Schizothorax esoscinus, Cyprinus carpio communis, Cyprinus carpio specularies, Carassius carassius etc.

EXPERIMENTAL FISHES

The fishes utilized for the purpose of project work were are:

1. Schizothorax niger
2. Schizothorax esoscinus
3. Schizothorax curvifrons
4. Schizothorax plagiostomus
5. Cyprinus carpio communis
6. Cyprinus carpio specularis

The fishes were got from the local fisherman and carried in polythene bags filed with water. The fishes used for experiment were freshly brought.

METHODOLOGY

Live fishes were collected in early morning along with fisherman, which were then taken to Fish Nutrition Research Laboratory of Department of Zoology, Kashmir University. First of all the length and weight of the fishes were taken. Fishes were dissected to remove the internal organs, length and head. The fish was then divided into anterior and posterior halves. The fish anterior and posterior halves were cutted along the lateral live into dorsal and ventral parts respectively. out and finally two pieces of muscles were taken from dorsal and ventral sides of each fish.

The pieces were put in Petri dishes. Firstly, the empty Petri dishes were washed and dried and kept in oven for drying at 110°C for about 24 hrs. For Schizothorax niger_ two Petri dishes were labeled as A1 and A2 for dorsal side and two were labeled as B1 and B2 for ventral side, before it the weights of empty Petri dishes were taken in an Electronic balance. The muscle samples were put in the labeled Petri dishes and weighed it again. In the same way the sample from dorsal and ventral side of fishes like _Schizothorax esocinus_ and _Schizothorax curvifrons_ were kept in other labeled Petri dishes as a1, a2 and b1, b2 for _Schizothorax esocinus_ and x1, x2 and y1, y2 for _Schizothorax curvifrons_. Similarly for other fishes species such as _Schizothorax plagiostomus_ _Cyrpinus carpio communis_ and _Cyprinus carpio specularis_ the same techniques were employed. These Petri dishes along with sample were kept in digital hot oven for drying at 110°C for about 24 hrs. After that these samples were taken from the oven and put in desiccators and finally weighed again, and then the moisture content of these fishes and feed sample were calculated.

Results

In carp highest moisture content is found in posterior ventral part. In schizothorax highest moisture content was found in Anterior ventral part (Fig.1-5).

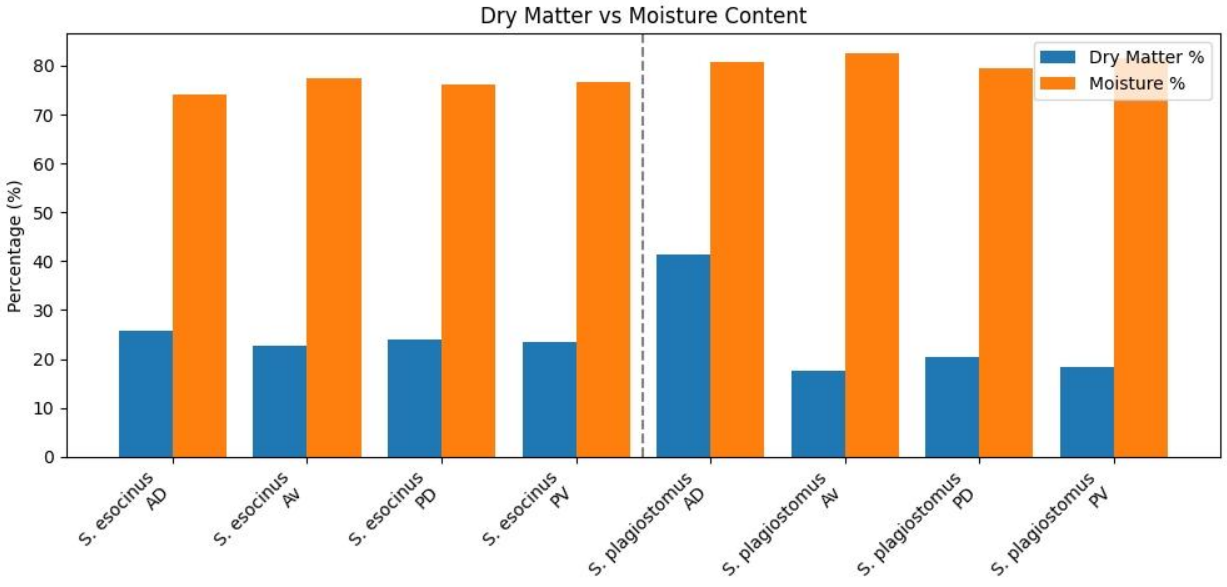

Fig.1: Dry matter vs Moisture content of Schizothorax species

Blue = Dry Matter %, Orange = Moisture %. They add up to ~100% for each sample. Notice the Anterior Dorsal (AD) of _S. plagiostomus_ has unusually high dry matter.
Ventral samples tend to have slightly higher moisture than Dorsal samples in both species
This shows % moisture for each sample. _S. plagiostomus_ generally has higher moisture than _S. esocinus_.

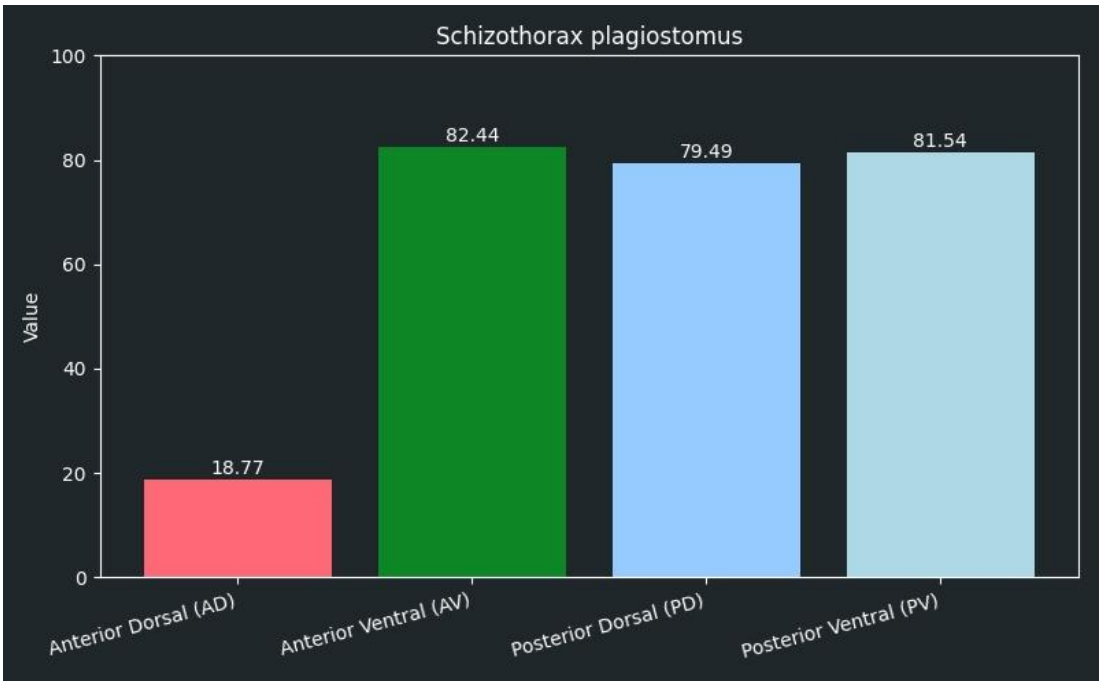

Fig.2: Moisture content by body region in Schizothorax plagiostomus

Anterio-ventral region of S. plagiostomus shows highest moisture content while as the lowest moisture content was found in Anterio-dorsal region.

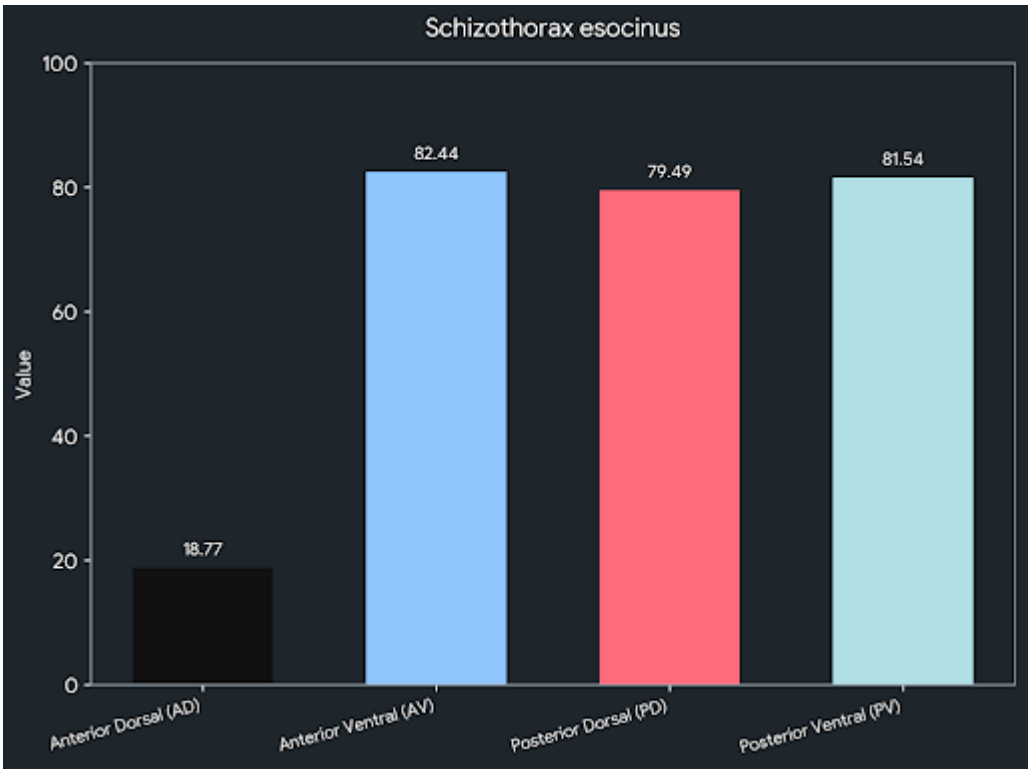

Fig.3: Moisture content by body region of Schizothorax esocinus

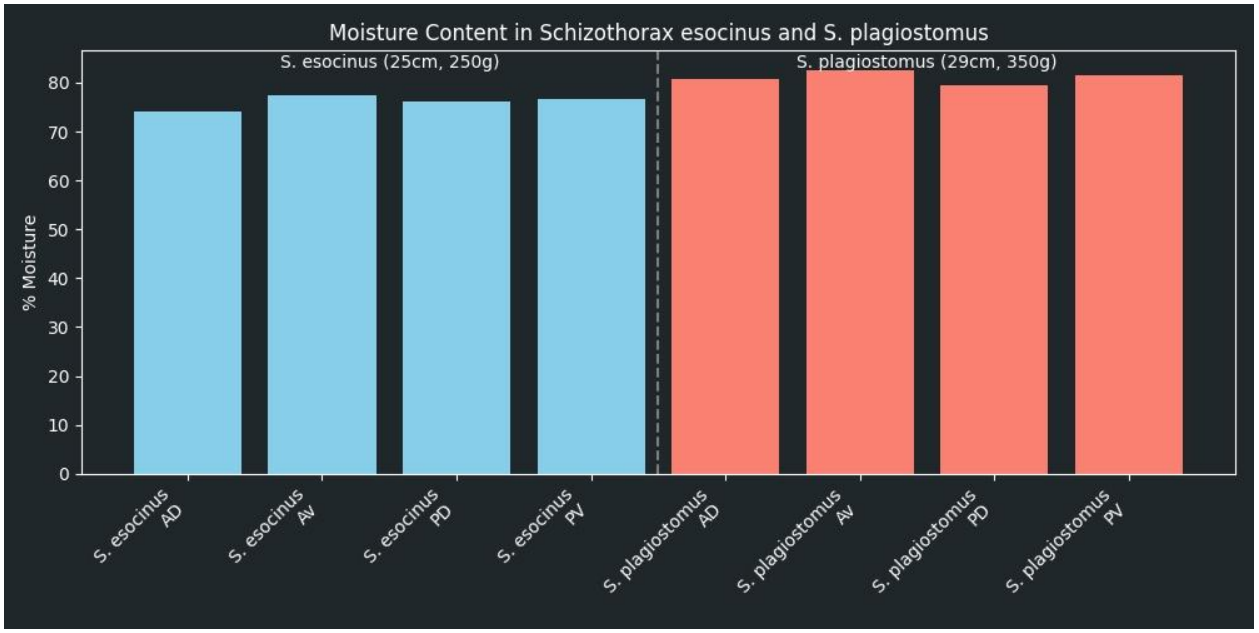

Fig. 4 Comparison of moisture content of Schothorax esocinus and Schizothorax plagiostomus

This shows % moisture for each sample. _S. plagiostomus_ generally has higher moisture than _S. esocinus_.

CONCLUSION

The nutritional and therapeutic value of fish has drawn widespread interest in public health and clinical research. 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 the biochemical composition of fish is not only essential for nutritionist for the purpose of formulating fish feed of 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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