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RESEARCH ARTICLE

PROXIMATE COMPOSITIONS OF MOISTURE AND ASH IN SOME IMPORTANT EDIBLE FRESH WATER FISH SPECIES OF KALABURAGI AREA

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ABSTRACT

The determination of moisture and ash content reflects nutritional state of the fish and studies on this aspect on local fish species becomes important to assess the health and nutritional status of particular fish. Hence, the present investigation is undertaken on four fish species locally available in large numbers, *Labeo rohita ,Notopterus notopterus, Pangusius bocourti and Red bellied pacu.* These fishes are being consumed extensively as food fish by the people of Kalaburagi and are marketed in the fish market of Kalaburagi,were brought and analyzed for proximate compositions of moisture and ash content. The results of the moisture show that the fish, *Labeo rohita (71.9%), Notopterus notopterus (73.6%), Pangusius bocourti (71.3%) and Red bellied pacu (73.3%).* Ash content in the above fishes shows that *Labeo rohita (35%), Notopterus notopterus (34%), Pangusius bocourti (30.8%)* and *Red bellied pacu (33%*). The ash content refers to the inorganic residue remaining by ignition or after complete oxidation, is a part of proximate analysis for nutritional evaluation and it is an important quality attribute for some food ingredients such as minerals. The percentage of ash content is 35%, 34%, 30%and 33% respectively in the above fishes studied. Thus the results suggest that the fish *Labeo rohita* has highest percentage of ash content as compared to other fishes. However, the *Notopterus notopterus* though small weighing fish has higher ash content than other two fishes. The percentage of ash content was determined by weight of the ash divided by the weight of the original sample multiplied by 100% of sample size. All the results are expressed in gm/100gm of whole fish for four fishes. The moisture and ash content values reported here indicate that are within the values reported in other fishes.

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INTRODUCTION

The Kalaburagi is a divisional head quarter in the northern Karnataka, though the place is dry in most of the period with less rain fall and fish consumption level was found to be relatively good. The place has good number of aquatic bodies and is being used for culturing fishes in the ponds and reservoirs in and around Kalaburagi. Fish contributes not only for their high nutritional value but also improving human health status. Consumption of fish has been recommended for the prevention of many diseases including heart disease (Rini Susilowati *et al*; 2016). However, information of nutritional status of fishes of this area is limited particularly on the body moisture and ash content. The moisture and ash content analysis is important for the evaluation of nutritional status and health of fish of a particular region. The ash content refers to the inorganic residue remaining by ignition or after complete oxidation, is a part of of proximate analysis for nutritional evaluation and it is an important quality attribute for some food ingredients such as minerals.

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There are some reports in other parts of Karnataka regarding nutritional compositions in relation to specific environmental conditions (Victoria, 2015' Mohanty *et al;* 2019), such studies are not available from this region .Hence, the present study on moisture and ash content of some important fish species which are marketed in the fish market of Kalaburagi which are consumed by the public are selected and undertaken for moisture and ash content.

MATERIALS AND METHODS

The four fish species selected are *Labeo rohita, Notopterus notopterus, Pangusius bocourti and Red bellied pacu* available in good number in the market are brought to the laboratory and immediately weighed and proper methodology was adopted in determining moisture and ash content. The moisture content was determined before freeze drying the fishes. This was carried out by dividing the body of fish into 3-4 uniform samples from all the parts of the fish. The wet samples were placed in the pre-weighed dry petridish and then weighed again. The petridish with wet samples kept in digital hot air oven for drying at 105 degree C. for about 24 hours or

until the constant weight was obtained. The dry samples were taken from oven and kept in decicators and allowed to cool to ambient temperature , after 30 minutes and then weighed in an electronic balance. The difference in weights from wet to dry was calculated and expressed as percentage of moisture content of the fish. The loss in weight was calculated as the moisture content.

$$\text{Percentage (\%) of moisture} = \frac{\text{Weight of original sample (g)} \quad \text{Weight of dried sample (g)}}{\text{Weight of the original sample (g)}} \times 100$$

The ash content of respective fish sample was determined by dry method and ashing the fish sample by subjecting to high temperature of 550 degree C. for 24 hours. Each fish species sample was oven dried in an electric oven at between 70 to 80 degree C. until they had constant weight. The moisture free dried fish samples were grinded and fine powdered with the help of mortar and pestle for converting samples into fine powder. The fine powdered moisture free samples were taken in clean pre-weighed silica crucibles and again weighed along with samples. The crucible containing samples was then placed in a muffle furnace at 65degree C.for about 4-6 hours or till the residue becomes completely white. The samples were then allowed to cool in decicators for about 20-30 minutes, reweighed and the amount of ash was calculated as the difference in weight. The percentage of ash was calculated with following formula;

Total percentage of ash = Weight of ash (g) / Weight of sample (g) X 100.

RESULTS

The two major components of fish such as moisture and ash in four types of edible fish species collected from fish market at Kalaburagi has been determined in the present study and percentage of these components and their significance is reported as the determination of moisture and ash content reflects nutritional state of the fish. The four fish species available in good numbers such as *Labeo rohita, Notopterus notopterus, Pangusius bocourti and Red bellied pacu* are being consumed by the people of Kalaburagi extensively. The results of moisture and ash in weight and percentage are presented in the table-1 and Fig.1. The percentage of moisture show that the fish, *Labeo rohita -71.9%, Notopterus notopterus -73.6%, Pangusius bocourti -71.3% and Red bellied pacu -73.3%.*The moisture content in all the four fish species found to be as required and normal with an average of 70% and above. The ash content in the above fishes shows that *Labeo rohita* -35%, *Notopterus notopterus -34%, Pangusius bocourti -30.8%* and *Red bellied pacu -33%*. The ash content refers to the inorganic residue remaining by ignition or after complete oxidation, is a part of of proximate analysis for nutritional evaluation and it is an important quality attribute for some food ingredients such as minerals. The percentage of ash content is 35%, 34%, 30%and 33% respectively in the above fishes studied. Thus the results suggest that the fish *Labeo rohita* has highest percentage of ash content as compared to other fishes. However, the *Notopterus notopterus* though small weighing fish has higher ash content than other two fishes.

Table 1. Showing total moisture and ash contents of some freshwater fishes collected from local aquatic bodies in Kalaburagi

Name of the fish	Total weight in grams	Dried fish in grams	Total Moisture content in gms and in %	Total ash content in gms and in %±
Labeo rohita	203±0.81	57±0.6	146 ± 1.52 (71.9%)	20 ±0.16 (35%)
Notopterus notopterus	110±1.00	29±0.60	81 ±0.70 (73.6%)	10 ±0.57 (34%)
Redbelled pacu	461±2,75	123±0.20	338 ± 0.90 (73.3%)	41 ± 0.29 (33%)
Pangasius bocourti)	713±0.36	204±0.29	509 ±0.26 (71.3%)	63 ± 0.21 (30%)

Each value is expressed as mean ± SD, N = 6. All values are significant P = < 0.01

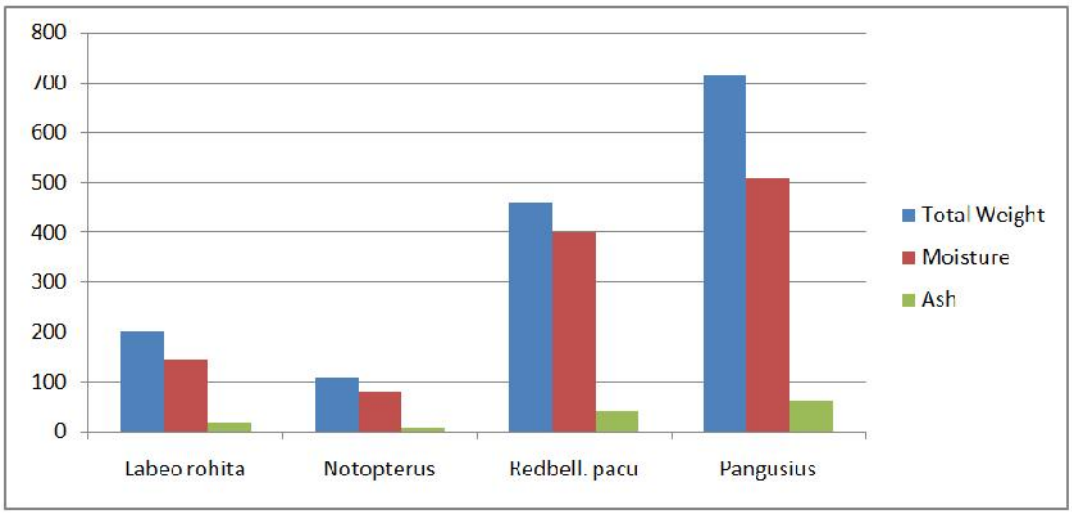

Fig. 1. Showing total weight, moisture and ash contents of some freshwater fishes collected from local aquatic bodies in Kalaburagi

Stastical analysis of the data

In all the cases six observations were made and the results are expressed as arithmetic mean with their standard deviation, standard error and student "t" test.

The percentage of ash content was determined by weight of the ash divided by the weight of the original sample multiplied by 100% of sample size. All the results are expressed in gm/100gm of whole fish for four fishes. The moisture and ash content values are presented in the table-1 and in histogram.

The results reported here indicate that the values obtained are within the values reported in other fishes.

DISCUSSION

In the present study all the four fish species showed variation in their two body constituents *i.e*. moisture and ash. Although moisture contents did not show too much difference among the four species however, the fish, *Notopterus notopterus* show statistically and significantly higher content in spite of its stream lined body and less in weight as compared to other three fishes. The overall results related to moisture content of different four fish species obtained in the present study is in accordance with the findings of other workers and reported (Marias and Erasmus,1997, Rini Susilowati *et al*; 2016; Uzma Shabir *et al*; 2018, Mohanty *et al*; 2019). The variation in the body ash content of four fish species studied here in the present study may be correlated with the health condition and availability of food in their respective feeding environment as reported for three economically important fish species of Kashmir valley (Uzma Shabir, 2018). The variation in moisture content in the four fish species in the present study may be dependent upon the quantity of fat in the body which could also be related to the feed availability of the fish and feeding pattern as *Labeo rohita* fish is a omnivorous and feeds on zooplankton, phytoplankton and submerged vegetation, the fish *Notopterus notopterus* is corn-omnivorous feeds on insects, plant roots and even small fishes, *Pangusius bocourti* is not only carnivorous is also voracious feeder and feeds on decaying animal and vegetative matters. The fish *Red bellied pacu* is also omnivorous fish. Based on the feeding habit the four fish in the present study they can be classified as mostly omni-cornivorous and variation of feeding habit, age, sex, environmental condition and season will affect the chemical compositions and nutritional value of fish (Ayas and Ozogul,2011; Fawole *et al*; 2013).

The ash content of four fishes ranges from 30% to 35% being the highest was *Labeo rohita* and proper amount of ash content in all the four fishes may be also related to the mineral concentration in the ash of all the four fishes. In the present investigation since it is found that all the four fishes have measurable and weighable ash content indicating proper mineral concentration in the ash and in the body of fish. The ash of fish contains macro and micro minerals as fish requires calcium,(Ca),magnesium (Mg), sodium (Na),Potassium (K), iron (Fe), Zinc(Zn), copper (Cu), and selenium (Se). Most researchers agree that fish requires all of these minerals as required by other animals (Prabhu *et al*; 2017), calcium and phosphorous are most directly involved in the development and growth of the skeleton and they act in several other biochemical reactions. Fish absorb calcium directly from water by the gills and skin and requirement for calcium is determined by the water chemistry (Athithan *et al*; 2013). Phosphorous is derived from dietary phosphate and its deficiency causes poor growth, magnesium requirement for fish met with either from food or from water, deficiency of magnesium causes reduced growth. The deficiency of all other macro minerals mentioned above causes abnormality and poor health condition of the fish. The micro minerals which include copper, iodine, iron, manganese selenium and zinc though present in the fish body in less amounts, are being absorbed from feed and water are also important for various physiological activities. The proper amount of ash and moisture content found in all the four fish species studied in the present investigation indicates that the fishes absorbing required amount of macro and micro minerals from the food and water available in the aquatic bodies of Kalaburagi for keeping good nutritional and health conditions.

Conclusions

The biochemical composition of whole body of fish indicates the quality of fish, Therefore, knowledge on biochemical composition of fish finds application not only in aquaculture industry, also in several areas including in human nutrition as food. The proper amount of ash and moisture content found in all the four fish species studied in the present investigation indicates that the fishes absorbing required amount of macro and micro minerals from the food and water available in the aquatic bodies of Kalaburagi for keeping good nutritional and health conditions.

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