

## Note

# Proximate composition of commercially important hill stream fishes of Manipur

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## ABSTRACT

Proximate composition of six smoked hill stream fishes viz., *Neolissochilus hexagonolepis*, *Raiamas guttatus*, *Schizothorax richardsonii*, *Semiplotus manipurensis*, *Tor putitora* and *Tor tor* has been studied. Moisture content ranged from 10.30 to 29.90% and ash content from 5.20 to 7.00% [Dry Weight Basis (DWB)]. Protein value was highest in *Schizothorax richardsonii* (79.25% DWB) and lowest in *Tor tor* (74.75% DWB). Highest value of lipid was observed in *S. manipurensis* (18.50% DWB) and lowest in *S. richardsonii* (9.00% DWB). Total lipid and protein values were considerably high in all the fishes.

In Manipur hill stream fishes are highly esteemed and fetch much higher prices than cultured carps because of their better taste and food value. Hill stream fishery is practiced in small scale in the state. There are few reports on the proximate composition of fishes of Manipur (Vishwanath and Sarojnalini, 1988; Lilabati *et al.*, 1993, Sarojnalini and Vishwanath, 1994). However, there is no report on the proximate composition of economically important hill stream fishes of Manipur. The present paper furnishes certain information on the nutritive value of six economically important hill stream fishes of the state.

Live specimens of six fishes viz., *Neolissochilus hexagonolepis*, *Raiamas*

*guttatus*, *Schizothorax richardsonii*, *Semiplotus manipurensis*, *Tor putitora* and *Tor tor* were collected from Challou river of Ukhrul District, during December-January 1997-1998. Specimens measuring 159.0-170.0 mm standard length (SL) were selected for this investigation. The fishes were exposed to smoke from burning wood at distance of about 30cm for about 2 hours.

Moisture was determined by the hot air oven method of Hart and Fisher (1971). Moisture content was expressed in percentage of the sample taken. Lipid was extracted and purified following the method of Folch *et al.* (1957). For protein, nitrogen value was estimated following the method of AOAC (1960). Then, total protein value was obtained by multiplying the value of

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nitrogen by Kirks conversion co-efficient 6.25. Total ash was determined by ISI method (1982). The value of protein, lipids and ash were expressed as dry weight basis (DWB).

Proximate compositions of six commercially important smoked hill stream fishes are presented in Table 1. In the present study the moisture content of the smoked fishes varied from 13.20% to 29.90%. Moisture content was not related with the other proximate compositions, as there is no standardized technique of smoking. The different value of moisture content in these fishes are considered as the results of the smoking time, heat applied in process and size of the fishes. According to Karel (1973), moisture content of fishes which ranges between 20% and 50% does not support active bacterial growth. However, these smoked fishes are susceptible to mould growth and enzymatic dehydration unless, properly preserved. Thus, the moisture content should be brought below 20% by exposing the sample longer to smoke, without losing the nutritive value of the product (Lilabati, 1996). In the present study moisture content of *N. hexagonolepis* (29.90%) and *S. manipurensis* (21.30%) was found to be more than 20% whereas other fishes has a

value lesser than 20% which may be considered quite safe.

Ash contents of the fishes were within the range of 5.20 to 7.00 (%DWB). Highest value was recorded in *T. tor* and lowest in *R. guttatus*. According to McCance and Shipp (1933) and Devadason *et.al.* (1978), smoking process may cause loss of water-soluble mineral elements. So in the process of smoking, mineral might have been lost as drip and this had lowered the value of ash in these smoked fishes.

Lipid contents of the fishes were very high, ranging from 9.00 to 18.50 (% DWB). Jafri (1968) reported that the lipid content in freshwater fishes were high during November and December. This may be due to the ecological conditions and food availability of these fishes. Lovern and Wood (1937) and Jafri (1968) correlated the high lipid content with intense feeding in fishes. High lipid contents appear to contribute much to the better taste of hill stream fishes.

Crude protein value was considerably high in all the fishes. In the present study, it ranged from 74.75 to 79.25 (% DWB). The value was highest in *S. richardsonii* and lowest in *T. tor*. It is widely accepted that the protein composition of tissues of fishes

TABLE 1. Proximate composition of *Neolissochilus Hexagonolepis*, *Raiamas guttatus*, *Schizothorax richardsonii*, *Semiplotus manipurensis*, *Tor putitora* and *T. tor*.

Compositi- on	<i>N.hexagonolepis</i>	<i>R.guttatus</i>	<i>S.richardsonii</i>	<i>S.manipurensis</i>	<i>T.putitora</i>	<i>T.tor</i>
Moisture (%)	29.90±0.90	13.20±0.70	10.30±0.80	21.30±1.20	14.70±0.95	14.80±0.80
Protein (DWB)	78.20±1.50	75.90±1.2	79.25±0.95	78.00±1.70	77.17±1.3	74.75±0.80
Total Lipid (DWB)	13.70±0.90	14.90±0.85	9.00±1.00	18.50±0.90	13.90±1.00	15.90±0.95
Ash (DWB)	5.30±0.20	5.20±0.40	6.50±0.80	5.40±0.60	6.2±0.30	7.0±0.50

Note: Results are given as mean + SD of 5 sampling. DWB=Dry weight basis.

are related to many factors such as feeding, growth maturation and spawning (Jafri, 1968) such as and metabolism, mobility of the fishes and geographical area (Stansby, 1962).

Fish production in Manipur is insufficient to meet the demand (Lilabati and Vishwanath, 1997). During the past two decades, there has been an increasing trend towards culture of Indian major carps and exotic carps (Chaudhuri and Banerjea, 1965). However, the tastes and flavours of the hill stream fishes are still highly esteemed and are preferred to other cultured fishes. It is also observed that protein and lipid value of the endemic fishes of Manipur was found to be higher than that of other freshwater fishes of India (Vishwanath and Sarojnalini, 1988). In the present study also the value of protein and lipid were found to be high. This may be due to the ecological condition of hill streams especially high velocity of water, high dissolved oxygen and abundant food availability which may enhance the internal metabolism of these fishes.

### Acknowledgements

We are grateful to the head, Department of Life Sciences, Manipur University for providing Laboratory facilities. The first author is grateful to - Special Assistance Programme for financial assistance.

### References

- A.O.A.C. 1960. *Official methods of Analysis* (9<sup>th</sup> edn.), Association of Official Analytical Chemists, Washington, DC.
- Chaudhuri, H. and S.M. Benerjea 1965. Report on the fisheries of Manipur with special reference to the development of the Takmu beel area of the Loktak lake. *CIFRI, Misc. Contr*, 4 :1-29.
- Devadasan, K., P.R.G. Verma and R.Venkataraman 1978. Studies on frozen storage characteristics of fillets from six species of fresh water fishes. *Fish. Technol.*, 15 (1): 1-6.
- Folch, J., M. Lees and G.H. Sloane-stanley 1957. A simple method for the isolation and purification of total lipids from animal tissues. *J Biol. Chem.*, 226: 497-509.
- Han, F. and H.J. Fisher 1971. *Modern Food Analysis*. Springer Verlag, New York, Hidelberg, Berlin, 206 pp.
- I.S.I. 1982. *Hand book of food Analysis*. Vol.6 Indian Standard Institute, New Delhi, 60-64.
- Jafri, A.K. 1968. Seasonal changes in the biochemical composition of the common carp, *Cirrhinus mrigala* (Ham.). *Broteria*, 36: 29-44.
- Karel, M. 1973. Recent research and development in the field of low moisture and intermediate moisture food. *Crit. Rev. Fd. Technol.*, 3: 329-373.
- Lilabati, H. and W. Vishwanath 1997. Biochemical, nutritional and microbiological quality of smoked *Anabas testudinius* brought to Manipur. *J Freshwater Biol.*, 9(1): 23-27.
- Lilabati, H., M. Bijen and W. Vishwanath 1993. Comparative study on the nutritive values of fresh and smoked catfish, *Clarias batrachus* Linn. *J. Freshwater Biol.*, 5(4): 325-330.
- Lilabati, H. 1996. *Evaluation of nutritional and microbiological quality of fresh, smoked and iced fishes of Manipur*. Ph.D. Thesis, Manipur University, Manipur.
- Lovern, J.A. and T.H. Wood. 1937. Variation in the chemical composition of herring. *J. Mar. Biol Assn.*, 22: 281-293.
- McCance, R.A. and H.L. Shipp. 1933. The chemistry of fresh foods and their losses on cooking. *Med. Res. Council. Spc. Rept. Ser. No.187*, 146.
- Sarojnalini, Ch. and W. Vishwanath. 1994. Composition and nutritive value of sun-dried *Punt us sophore*. *J. Food Sci. Technol.*, 31(6): 480-483.
- Stanby, M.F. 1962. Proximate composition of fish. In : R. Heen and R. Krezer (Eds.).

*Fish in nutrition*, London Publ. News  
(books) Ltd., 55 pp.

Vishwanath, W. and Ch. Sarojnalini. 1988.  
Nutritive value of some fishes endemic  
in Manipur. *Indian J. Fish.* **35**(2): 115-  
117.