Print ISSN : 0972-8813
e-ISSN : 2582-2780

[Vol. 20(2), May-August, 2022]

# Pantnagar Journal of Research

**(Formerly International Journal of Basic and Applied Agricultural Research ISSN : 2349-8765)**

G.B. Pant University of Agriculture & Technology, Pantnagar

# PANTNAGAR JOURNAL OF RESEARCH

Vol. 20(2) May-August, 2022


## CONTENTS


**Mapping rice residue burning in Punjab state using Satellite Remote Sensing** **184**
MANISHA TAMTA, VINAY KUMAR SEHGAL and HIMANI BISHT

**Plumule colouration as a criterion to improve the efficiency of R1-nj marker based doubled haploid breeding in maize** **192**
PRABHAT SINGH, MUKESH KUMAR KARNWAL, SMRUTISHREE SAHOO, ARVIND CHAUHAN and NARENDRA KUMAR

**Effect of nitrogen scheduling on fodder yield, quality and economics of multi cut fodder oat (*Avena sativa L.)*** **199**
SONAL SAKLANI and MAHENDRA SINGH PAL

**Prediction of above ground biomass in *Dendrocalamus hamiltonii* using multiple linear regression in Uttarakhand state of India** **204**
ANJULI AGARWAL

**Soil micronutrient availability as influenced by monosaccharide distribution in cultivated farm land, Nigeria** **209**
A. O. BAKARE, I. U. EFENUDU and I. P. EGHAREVBA

**Laboratory evaluation of Dashparni extract against bollworm complex of cotton** **216**
RACHNA PANDE, RAMKRUSHNA GI, NEELKANTH HIREMANI and SUNITA CHAUHAN

**Long term efficacy of seven essential oils against *Sitophilus oryzae* (Linnaeus), *Rhizopertha dominica* (Fabricius) and *Tribolium castaneum* (Herbst)** **221**
DEEPA KUMARI and S. N. TIWARI

**Effect of some fungicides on Alternaria leaf blight disease and yield of mustard** **229**
A.K. TEWARI, K.S. BISHT and POOJA UPADHYAY

**Effective management strategies for sheath blight disease of barnyard millet (*Echinochloa crusgalli* L.) incited by *Rhizoctonia solani* in hills of Uttarakhand** **234**
LAXMI RAWAT, AKANSHU, SUMIT CHAUHAN, POOJA BAHUGUNA, ASHISH TARIYAL and AJAY MAMGAIN

**Comparative studies of the effect of microbial inoculants and inorganic chemicals on growth, yield, yield contributing traits and disease suppression in two varieties of mustard green (*Brassica juncea* L.) under open field conditions in mid hills of Uttarakhand** **247**
MONIKA RAWAT, LAXMI RAWAT, T. S. BISHT, SUMIT CHAUHAN, POOJA BAHUGUNA and AJAY MAMGAIN

**Effect of different varieties of *Raphanus sativus* as bio-fumigants and microbial biocontrol agents for the management of *Pythium aphanidermatum* causing damping off in tomato** **258**
MANJARI NEGI, ROOPALI SHARMA, ARCHANA NEGI and BHUPESH CHANDRA KABDWAL

**The impact of the school vegetable garden on vegetable consumption among students** **264**
AJIT, T.G. ELDHO. P. S and MERCYKUTTY, M.J.

**Comparative analysis of schools on student's attitude, knowledge level and perceived effectiveness on school vegetable garden** 269
AJIT, T.G., ELDHO. P. S and MERCYKUTTY, M.J.

**Prevalence of sick buildings in Uttarkashi District of Uttarakhand** 274
NIDHI PARMAR

**Awareness and prevalence of hypertension among educated Indians with internet access during COVID-19 and associated risk factors** 284
NIDHI JOSHI, RITA SINGH RAGHUVANSHI and ANURADHA DUTTA

**Prevalent sun protection practices among college going girls** 297
BEENU SINGH and MANISHA GAHLOT

**A study on productive and reproductive management practices of dairy animals in district Varanasi of Uttar Pradesh** 302
AMAR CHAUDHARI, RISHABH SINGH and PUSHP RAJ SHIVAHRE

**Nucleocapsid Segment Sequence based phylogenetic analysis of different strains of Crimean Congo Haemorrhagic fever virus encountered in India over last decade** 307
AMAN KAMBOJ, SHAURYA DUMKA and CHINMAY GUPTA

**Rabies meta-analysis in dogs and human** 312
A. K. UPADHYAY, R. S. CHAUHAN, MAANSI, N. K. SINGH and S. SWAMI

**Nanosilica induced pathological changes in Wistar rats** 316
NEHA, MUNISH BATRA and R.S. CHAUHAN

**Emerging and re-emerging zoonoses of India originating from dogs and cats** 324
SOURABH SWAMI and AJAY KUMAR UPADHYAY

**Assessment of physiological characteristics and effect of load on agricultural workers during cranking operation** 328
SWEETI KUMARI, V.K.TEWARI and SANJEEV KUMAR

**Sensitivity analysis of breach width parameter of Ramganga dam, using 2D HEC-RAS** 335
PRANAV SINGH, JYOTHI PRASAD and H. J. SHIVA PRASAD

**Parametric optimization of friction stir welding for electrical conductivity of aluminium joints using ANN approach** 341
MANEESH TEWARI, R.S. JADOUN and DEVAKI NANDAN

**Length-weight relationship and condition factor of four fishes of the Family Trichiuridae south west and east coast of India** 346
CHITRA M.C. and M.K. SAJEEVAN

**Effectiveness of instructional material on gain in knowledge of rural women** 351
PREMLATA, DHRITI SOLANKI and RAJSHREE UPADHYAY

**An updated checklist of planktonic Copepods from the major estuaries of Kerala (Vembanad and Ashtamudi), south-west coast of India** 356
HANI P.M. and JAYALAKSHMI K.J

**Proximate composition of Bengal Corvina, *Daysciaena albida* (Cuvier 1830) from Vembanad lake** 367
KITTY FRANCIS C. and M. K. SAJEEVAN

# Proximate composition of Bengal Corvina, *Daysciaena albida* (Cuvier 1830) from Vembanad lake

KITTY FRANCIS C. and M. K. SAJEEVAN
*Fisheries Resource Management, Kerala University of Fisheries and Ocean Studies, Panangad, Kochi- 682506 (Kerala)*

**ABSTRACT:** The proximate analysis of *Daysciaena albida* in which protein, moisture, fat, ash, carbohydrate, and energy were present at the label of 19.90%, 79.13%, 3.46%, 1.43%, 0%, and 110.83 Kcal/100g respectively. Present findings demonstrate that the species has excellent macronutrient value. This fish has low-fat, high protein, and a good amount of energy. It was concluded that this fish can be used in value-added products as well as highly essential dietary supplements.

**Key words**: Croakers, *Daysciaena albida*, energy, proximate composition

Bengal Corvina / Two-bearded croaker *Daysciaena albida* (Cuvier 1830) belongs to the Family Sciaenidae is a benthopelagic amphidromous fish (Fricke *et al.,* 2022) that primarily inhabits brackish water. This fish is a commercially important food fish of Vembanad Lake on the west coast of India. Flesh and swim bladders of sciaenid are exported and regarded as a delicacy in other Asian countries (Ben-Hasan *et al.*, 2021). Bengal Corvina is valued for their high-quality protein content as well as their abundance of unsaturated fatty acids and essential amino acids. The ability to avoid diseases like cancer, cholesterol, and cardiovascular disease adds to this (Torris *et al.,* 2018). A significant determinant of the fish's acceptability as quality food is its biochemical composition in the flesh (Abimbola, 2016). Consumers in this region favor *Daysciaena albida* because of its white meat. The primary goal of this study is to determine the proximate composition of this significant fish. Even though it is one of the most favored, prized, and heavily landed fish in this region, studies on this estuarine species are scarce, and its composition is undocumented. There are works on the proximate analysis of sciaenids from Indian waters but there is no works on the proximate composition of *Daysciaena albida* till date (Kuttyayappan, *et al*., 1976; Bijukumar *et al.,* 2013); Mehta *et al*., 2015)

## MATERIALS AND METHODS

### Sample collection

The fresh samples of Bengal Corvina were taken from local fishermen from Vembanad Lake (Fig 1), Kerala on the west coast of India. The samples collected were preserved in an ice box immediately to preserve the flesh quality. The sample was taken to the laboratory in iced condition. The mean length of the fish samples taken was 33cm and mean weight was 430 grams.

### Proximate Composition

The proximate component analysis (Moisture, Total Ash, Fat, Protein, Carbohydrates, Energy) was done using the below given standard procedures. Moisture was tested using the standard procedure of AOAC (2019), 950.46.Total ash was tested using AOAC (2019), 938.08. Fat content was tested using AOAC (2019), 960.39. Protein Content using AOAC (2019) 928.08. Carbohydrate was done using IS 1656 (2007), (RA 2009).The energy was calculated following Kirk and Sawyer (1991).Standard deviation from the mean values are calculated by the formulae $\sqrt{[\sum_{i=1}^{n}(xi-\bar{x})^2]/n-1}$, where $x_i$ is the value of the $i^{th}$ point in the data set, $\bar{x}$ is the mean value of the data set and n is the number of data points in the data.

## RESULTS AND DISCUSSION

The proximate analysis of fish meat of *Daysciaena albida*

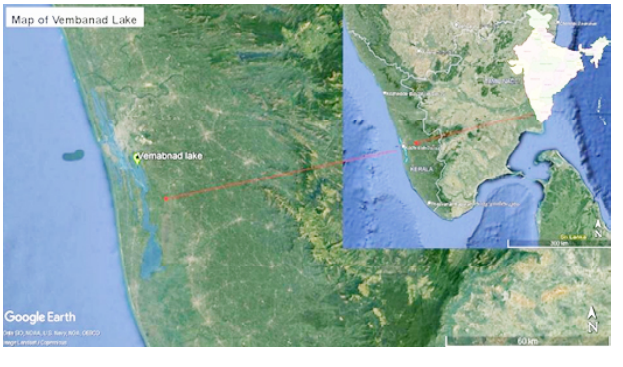


**Fig 1: Map of Vembanad Lake**

Source: Google Earth

is given in Table 1.In the present study, the Protein content in fish is found to be 19.90%. Which is a high amount of protein in fish as fish flesh is having water content of 66–81%, carbohydrates <0.5%, ash 1.2 to 1.5%, protein 16–21%, fat 0.2–25%(FAO, 1999). High protein content may due to the carnivorous behavior of this fish which mainly include protein-rich organisms like shrimp, crab, other small fishes, other smaller crustaceans, etc (Kurup and Samuel, 1988). The protein content is reduced during the spawning season (Ando and Hatano, 1986). Marine fishes on the Indian coast are reported to have 60-80% of moisture content (Gopakumar, 1997). The moisture content in *D. albida* is about 79.13%.Intake of food and fat content in the body has a significant influence on moisture level (Maynard *et al*., 1984). Ackman (1989) grouped fishes into four according to their fat content. Fishes with < 2% fat are considered lean fishes those with 2 to 4% fat are low-fat fishes, 4 to 8% are medium-fat fishes and>8% fat is for high-fat fishes, he also described low values of lipid content are due to poor storage mechanisms and utilization of fat reserves during the spawning period. Fat content in present croaker species is 3.46% which includes this fish in low-fat fishes. The fat content depends on the food taken by the fish and also on the environment (Onyia *et al*., 2010). The difference in the fat content can be due to sex, age, feeding behavior, spawning season, etc. According to FAO (1999) moisture and lipid are inversely related to the total composition of fish . The total ash content in this fish is 1.43%. Seasonal changes, Physicochemical parameters, and Biological factors including feeding, and reproductive characteristics influence the mineral and trace element concentration that contributes to total ash (Akande and Faturoti, 2005). The carbohydrate value in the present species shows a value of zero. The carbohydrate value in fresh fish has a very low value or zero in many cases (Payne *et al*., 1999; Anthony *et al*., 2000). The energy value of this fish determined from present study is 110.83 Kcal/100g which is quite a good amount .

**Table 1: Proximate Composition of *Daysciaena albida***

| Sl. No. | Parameter Tested | Results (Mean ± S.D) | Limit of Qualification (LOQ) |
|---|---|---|---|
| 1 | Moisture(%) | 79.13±0.01 | 0.1 |
| 2 | Total Ash(%) | 1.43±0.02 | 0.1 |
| 3 | Fat(%) | 3.46±0.03 | 0.1 |
| 4 | Protein(%) | 19.90±0.02 | 0.1 |
| 5 | Carbohydrates(%) | 0±0 | 1.0 |
| 6 | Energy(Kcal/100g) | 110.83 | 10.0 |

Abbreviation: S.D is standard deviation.

The comparison of the present study with the earlier studies from the Indian waters is given in Table 2. The protein and fat content of *D. albida* are more compared to the other species in the family Sciaenidae. The estuarine habitat which is nutrient rich, the protein rich carnivorous diet may be explained as reasons for the more protein and fat content in *D. albida*. The composition of fishes can vary according to Spatio-temporal differences, biological characteristics, and due to environmental factors (Lawson *et al*., 1998; Saadettin *et al*., 1998).This can be well defined from the present study.

## CONCLUSION

This species has excellent macronutrient value compared to the other species from the same family. This fish is low-fat, high in protein, and has a good amount of energy. This fish can be used in value-added products as well as a highly essential dietary source. Fatty fishes have high levels of *n*-3 fatty acids and lean fish contains many nutrients which are efficient in the prevention of cardiovascular diseases (Torris *et al*., 2018). Fish can serve as ideal diet food as it has high nutritive values and can play an important part in human health (Abimbola, 2016). Present study recommends include this high protein-rich fish in the daily diet of human.

## ACKNOWLEDGEMENTS

The authors are grateful to the authorities of the Kerala University of Fisheries and Ocean Studies (KUFOS) for all the infrastructure and facilities and the scholarship they provided for the research.

## REFERENCES

Abimbola, A. O. (2016). Proximate and mineral Composition of Pseudotolithus senegalensis and Pseudotolithus typus from Lagos Lagoon,

**Table 2: Comparison of Proximate Composition of Different Sciaenids in Indian Waters.**

| Sl.No. | Species | Moisture | Protein | Fat | Ash | Reference |
|---|---|---|---|---|---|---|
| 1 | *Daysciaena albida* | 79.13±0.01 | 19.90±0.02 | 3.46±0.03 | 1.43±0.02 | Present study |
| 2 | *Johnius dussumieri* | 81.42±0.70 | 15.38±0.21 | 1.28±0.05 | 1.01±0.11 | Mehta *et al.* (2015) |
| 3 | *Johnius belangerii* | 75.9±2.46 | 15.83±1.83 | 2.5±0.35 | 1.85±0.38 | Bijukumar *et al.* (2013) |
| 4 | *Otolithes cuvieri* | 72.95±.08 | 19.69±1.94 | 1.35±0.34 | 2.18±0.43 | Bijukumar *et al.* (2013) |
| 5 | *Pseudosciaena sp.* | 78.08 | 16.77 | 2.3 | 3.2 | Kuttyayappan, *et al.* (1976) |

Nigeria. *Food and Applied Bioscience Journal*, 4(1):35–40.

Ackman, R.G. (1989). Nutritional composition of fats in seafood. *Progress in Food Nutrition Science,* 13: 161–241.

Akande, G.R. and Faturoti, E. O. (2005). Technological properties and biochemical studies of Bonga: Ethmalosa fimbriata. *Fishery Technology*, 42(1): 61–66.

Ando, S. and Hatano, M. (1986). Biochemical characteristics of chum salmon muscle during spawning migration. *Bulletin of Japan Society of Science and Fisheries,* 52:229–234.

Anthony, J.A., Roby, D.D., and Turco, K.R. (2000). Lipid content and energy density of forage fishes from the Northern Gulf of Alaska. *Journal of Experimental Marine Biology and Ecology*, 248: 53-78.

AOAC. (2019). In: Official method of analysis of AOAC International, Vol I, 21st ed. Association of Official and Analytical Chemists International, Virginia,1800 p.

Ben-Hasan, A. *et al.* (2021). 'China's fish maw demand and its implications for fisheries in source countries', *Marine Policy*, 132 (November 2020). doi:10.1016/j.marpol.2021.104696.

Bijukumar, A., Deepthi, G.R. and Nair, K.G.P. (2013). 'Proximate Composition of Fish in the Trawl By-Catch and Discards of Kerala, South-West Coast of India', *Journal of Aquatic Biology & Fisheries*, 1(1–2): 106–116.

Food and Agricultural Organization (FAO) (1999). World production of fish, crustaceans, and molluscs by major fishing areas. Fisheries Information Data and Statistics Unit. Fisheries Department, F. A. O. Rome. 33 p.

Fricke, R., Eschmeyer,W. N. and Van der Laan (eds). (2022). Eschmeyer's Catalog of Fishes: Genera, Species, References (http: // researcharchive. calacademy. org/ research/ ichthyology/ catalog/ fishcatmain. asp) Electronic version accessed July 2022.

Gopakumar, K. (Ed.) (1997). Biochemical Composition of Indian Food Fish. Central Institute of Fisheries Technology, Cochin, 44 p.

IS 1656 2007.2009. RA. Milk-cereal-based complementary foods- Determination of total carbohydrate. Bureau of Indian Standards (BIS).

Kirk, S. and Sawyer, R. (1991). Pearson's composition and analysis of foods (No. Ed. 9). Longman Group Ltd.

Kurup, B.M. and Samuel, C.T. (1988). Food and feeding habits of Daysciaena albida (Cuvier) from the Vembanad lake, *Indian Journal of Fisheries*, 35 (4): 317-322.

Kuttyayappan, M.P., Vasanth Shenoy, A. and Gopakumar, K. (1976). Proximate composition of 17 species of Indian fish, *Fisheries Technology*, 13(2): 153–155.

Lawson, J.W., Magalhães, A.M. and Miller, E.H. (1998). Important prey species of marine vertebrate predators in the northwest Atlantic: proximate composition and energy density. *Marine Ecology Progress Series*, 164: 13–20.

Maynard, L. A., Loosli, J. K., Hintz, H. F. and Warner, R. G. (1984). Animal nutrition, 7th Edn. McGraw-Hill Book Company, New York, 602 p

Mehta N. K.,Shitole .S and Nayak, B. B. (2015). Proximate composition and fatty acid profile of commercially important sin croaker fish, *Journal of Environment and Bio-Sciences*, 29 (2):1-4.

Onyia, L. U., Milam, C, Manu, J. M. and Allison, D. S. (2010). Proximate and mineral composition in some freshwater fishes in upper River Benue, Yola, Nigeria. *Continental Journal of Food Science and Technology,* 4:1–6.

Payne, S.A., Johnson, B.A. and Otto, R.S. (1999). Proximate composition of some northeastern Pacific forage fish species. *Fish Oceanography*, 8(3): 159-177.

Saadettin, G., Dincer, B., Alemdag, N., Colak, A. and Tufekci, M. (1998). Proximate composition and selected mineral content of commercially important fish species from the Black Sea. *Journal of Food Science of Food Agriculture*, 78: 337-342

Torris C., Smastuen M.C. and Molin M. (2018). Nutrients in Fish and Possible Associations with Cardiovascular Disease Risk Factors in Metabolic Syndrome. *Nutrients*, 10(7):952.

*Received: August 26,2022*
*Accepted: August 31, 2022*