THE FREE ALPHA AMINO ACID NITROGEN CONTENTS OF SOME COMMON FOOD FISHES OF KAKINADA REGION, ANDHRA PRADESH

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The moisture and free alpha amino nitrogen contents of some important food fishes and shell fishes of Kakinada region have been studied. Crustaceans and molluscs contain free alpha amino acids in quantities several times higher than all other aquatic animals examined in this study. Their probable role in the physiological activities of these animals has been discussed.

Introduction

Free alpha amino acids are important constituents of the non-protein nitrogen fractions of fresh fish muscle, contributing to their flavour and probably playing a significant role in their physiological activities like osmoregulation at least in some species where they are encountered in comparatively very high proportions. The amount of amino acid nitrogen in aqueous extractives and its ratio to the total extractive non-protein nitrogen was found to be related to the flavour of tuna meat and relatively high proportion of diamino acids was associated with good flavour (Simizu, 1948). It has also been clearly established that in no less than ten commercial shrimp varieties, flavour is related to the content of amino nitrogen, particularly of the mono amino group, more than half of which was represented by glycine (Borgstrom, 1961). Velankar and Govindan (1957, 1958) have made an elaborate study of the distribution of non-protein nitrogenous constituents in some food fishes of Mandapam area (Tamil Nadu) and found that the free alpha amino nitrogen in teleosts is only about 6% of the non-protein nitrogen, while in invertebrates it accouts for over 40%. Suryanarayanan and Alexander (1972) detected the presence of 13 to 16 free amino acids in five commercially important edible bivalves of Kerala viz; *Lamellidens corrianus*, *Corbicula striatella*, *Mytilus edulis*, *Vellorita cochinensis* and *ostrea cucullata* by means of paper and thin layer chromatography. Hence it was thought of interest to study the occurrence of this constituent in some of the common food fishes and shell fishes available in this locality.

TABLE I

Moisture, free amino acid nitrogen contents etc. of the fishes and other animals studied.

Date of analysis	Scientific name	Common name	Vernacular (Telugu) name	Size mm.	Source	Moisture %	Free amino acid N.mg.% OWB
Teleosts							
27-3-74	*Lactarius lactarius*	Big-jawed Jumper	Chudumu	160.0	Marine	72.0	25.0
4-4-74	*Nemipterus Japonicus*	Pink Perch	Erra gulivinda	143.0	,,	78.0	24.5
,,	*Sciaenid sp.*	Jew fish	Gorsa	169.0	,,	79.0	13.0
4-6-74	,,	,,	,,	230.0	,,	76.0	21.9
,,	*Polynemus tetradactylus*	Threadfin	...	260.0	,,	76.4	39.2
5-6-74	*Hilsa ilisha*	Hilsa	Polsha	350.0	,,	72.0	30.5
12-6-74	*Stromateus sp.*	Black pomfret	Nalla sanduva	300.0	,,	73.4	36.8
19-8-74	*Harpodon nehereus*	Bombay duck	Vanamatta	263.0	,,	90.9	16.3
3-1-74	*Chanos chanos*	Milk fish	Palabonta	340.0	Brackish water	73.9	103.0
22-7-74	*Mugil cephalus*	Mullet	Katachappa	350.0	,,	73.0	56.2
11-7-74	*Catla catla*	Catla	Bochu	295.0	Fresh water	73.2	107.6
29-5-74	,,	,,	,,	340.0	,,	75.2	164.9
13-5-74	*Labeo rohita*	Rohu	Mosu	297.5	,,	77.6	91.8
,,	*Cirrhinus mrigala*	Mrigal	,,	280.0	,,	78.6	56.0
20-5-74	*Clalus batrachus*	Magur	Maruppu	235.0	,,	72.3	64.3
22-5-74	*Labeo calbasu*	Calbasu	Mosu	240.0	,,	77.3	65.2
23-5-74	*Anabas testudineus*	Climbing perch	Goraka	110.0	,,	78.4	54.4

Elasmobranchs:							
10-5-74	*Trigonid* sp.	Ray fish	Teku	660.0(dia)	Marine	73.8	32.4
17-5-74	*Carcharinid* sp.	Shark	Sorrah	570.0	,,	73.7	47.0
Crustacea:							
20-3-74	*Metapenaeus dobsoni*	Prawn	Royya	93.7	,,	74.2	175.0
23-3-74	,,	,,	,,	105.0	,,	74.0	185.0
,,	*M. affinis*	,,	,,	101.3	,,	76.2	219.0
9-4-74	*Penaeus monodon*	,,	,,	225.0	,,	76.0	437.0
7-1-74	,,	,,	,,	102.7	Brackish water	79.0	333.0
8-1-74	*P. indicus*	,,	,,	99.5	,,	77.0	319.8
9-1-74	*M. brevicornis*	,,	,,	116.0	,,	75.0	322.0
19-7-74	*P. indicus*	,,	,,	140.0	,,	71.7	236 0
31-12-73	*Scylla serrata*	Crab	Mandapeetha	170.0	,,	78.2	283.0
11-2-74	,,	,,	,,	170.0	,,	81.9	198.0
Mollusca:							
18-3-74	*Mytilus viridis*	Green mussel	Aluchippa	155.0	Brackish water	81.7	77.5
28-3-74	,,	,,	,,	109.0	,,	77.0	161.0
26-4-74	,,	,,	,,	,,	,,	76.5	135.0
16-1-74	*Sepia* sp.	Cuttle fish	Kandavalu	95.0	Marine	75.6	186.0
22-2-74	,,	,,	,,	117.5	,,	74.6	67.1
6-2-74	*Loligo* sp.	Squid	,,	132.5	,,	73.6	190.0

Materials And Methods

The fishes and other animals used in this study belonged to marine, brackish water and fresh water origin. All the fresh water fishes and part of the marine and brackish water forms were obtained from the local market, while the rest of the marine and brackish water forms were procured from the mechanised fishing boats operating at Kakinada and a local fish farm respectively. All the animals which were quite fresh at the time of procurement were brought to the laboratory, lengths measured in mm., washed in tap water and edible flesh separated for analysis. Moisture was estimated according to A.O.A.C. (1960) method, while free alpha amino acid nitrogen was estimated by the method of Pope and Stevens (1939) as applied by Velankar and Govindan (1958, *loc. cit.*).

Results And Discussion

The sizes in mm., moisture contents as percentages of original weights of flesh and free alpha amino acid nitrogen contents as mg. N/100g. wet edible muscle along with dates of analysis, scientific, common and vernacular (Telugu) names of the fishes and their sources are presented in Table I.

It may be seen from the table that the free alpha amino acid nitrogen contents of marine teleosts and elasmobranches examined in this study are consistently low. The values are consistently high with crustacea, while the varieties of mollusca studied exhibit comparatively lower levels. These results are largely in agreement with those reported by Velankar and Govindan (1958, *loc. cit.*). The fluctuations observed in the moisture contents of the fishes can be attributed to the variations in their fat contents as it is well known that moisture contents of fishes are inversely proportional to their fat contents. The fact that crustaceans and molluscs are several times richer in free alpha amino acids than all other aquatic animals suggest that they must be having an important physiological role in the former classes of animals. Fourteen percent of the nitrogenous compounds excreted by invertebrates has been reported to be amino acids, while the excretions of fishes contain only small amounts of these compounds (Baldwin, 1940). Free amino acids have also been reported to act as buffering agents, metal chelating agents, protective substances and extra cellular utilizable substrates for sperm cells (Isa and Roger, 1973). An analogy may be found in another non-protein nitrogenous constituent commonly encountered in the fish muscle, *viz*; trimethylamineoxide which occurs in large quantities in marine fishes while it is practically absent from fresh water fishes, suggesting some role it must be playing in osmoregulation in these fishes. A parallel relationship has been observed between the salinity of Cochin back waters and trimethylamineoxide contents of prawns taken from them the latter increasing with the former (Velankar and Govindan, 1960). Hegemann (1964) demonstrated that perch and pike taken from brackish water of salinity 7 parts per thousand excreted their whole trimethylamineoxide in 24 hours when put in fresh water and when they were returned to brackish water of salinity 10.3 parts per thousand, they synthesized the compound again in their bodies. In a similar manner, free alpha amino acids also must be playing some important role

in the physiological activities of the animals in which they occur abundantly, which aspect requires further detailed investigations. They also provide excellent substrates for micro organisms along with the carbohydrate, glycogen, also invariably found in large quantities in crustacean muscles, which fact explains why their shelf lives are comparatively much shorter than those of the teleosts.

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