

TABLE 3. *Proportion of mixture.*

	NOV '71	DEC '71	JAN '72
N ₁ /N	0.4091	0.2495	0.4301
N ₂ /N	0.5909	0.5361	0.5699
N ₃ /N		0.2144	

ber and January ranging between 41-43%. In December, however, the third component and first component were found to exist in more or less equal proportions.

The authors are thankful to Dr. V. G. Jhingran, Director, for his interest in the study and to Dr. V. Gopalakrishnan for critically going through the manuscript.

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BIOCHEMICAL COMPOSITION OF THE LAMELLIBRANCHS *MERETRIX CASTA* (CHEMNITZ) AND *SANGUINOLARIA DIPHOS* (GMELIN)

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The two eulamellibranch bivalves, *Meretrix casta* (Chemnitz) (Family: Veneridae) and *Sanguinolaria diphos* (Gmelin) (Family: Psammobiidae) are found in Vellar estuary, Porto Novo (Lat. 11°29'N and Long. 72°49'E). *Meretrix casta* occurs in good quantities in the estuary while *Sanguinolaria diphos* is found in small numbers. Hornell (1917) pointed out that the clam *Meretrix casta* "is probably the most important food mollusc of the Madras Presidency".

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At Porto Novo, both *Meretrix casta* and *Sanguinolaria diphos* are taken as food, especially by the poor. To study the nutritive value, the water, protein, fat, carbohydrate and ash contents of *Meretrix casta* and *Sanguinolaria diphos* have been analysed and the results obtained are presented here. Observations made on the free and bound amino acids present in the meat of these bivalve molluscs are also reported.

Meretrix casta and *Sanguinolaria diphos*, freshly collected from Vellar estuary, Porto Novo, were used for the present study. Water content was estimated by drying the meat of the bivalves in an oven at 70-80°C to constant weight. Protein content was estimated by Biuret method (Raymont *et al.* 1964). The fat content was estimated by chloroform-methanol method (Folch *et al.* 1956). Carbohydrate content was estimated by phenol-sulphuric acid method (Dubios *et al.* 1956). To determine the ash content, the meat was taken in a porcelain crucible and ashed at 600°C for 6 hours in a muffle furnace. For determining the proximate composition, as many as ten readings were taken for each species and the average determined. For the study of the amino acid composition, the free amino acid extract was prepared by adding absolute alcohol to thrice the volume of the meat extract and centrifuging it. Bound amino acids were hydrolysed with 6 N HCl and extracted by centrifuging with 10% Isopropyl alcohol. The supernatant was taken and to it was added thrice its volume of chloroform; it was then centrifuged and the supernatant was taken for chromatography. Circular paper chromatographic analysis for amino acids was carried out on a Whatman No. 1 filter paper. N-Butanol, acetic acid and water mixed in the ratio of 12:3:5 was used as the solvent. 0.25% Ninhydrin was used as the colour developing reagent.

The values of water content of *Meretrix casta* (81.96%) and *Sanguinolaria diphos* (80.32%) are lower than those mentioned by Vinogradov (1953) for *Ostrea edulis* (78.70-87.36%) and near those for *Mya arenaria* (83.46%), *Pecten irradiatus* (80.32%) and *Venus mercenaria* (84.56%). Srinivasan and Krishnaswamy (1963) have reported water content of 77% in *Martesia fragilis*. Venkataraman and Chari (1951) have found that the water content in *Meretrix casta* of Ennore backwaters varies from 73.18% to 84.02%.

The protein contents of both the bivalves studied are high being 10.77% in *Meretrix casta* and 10.94% in *Sanguinolaria diphos*. Venkataraman and Chari (1951) have reported that the protein content of *Meretrix casta* varies between 5.96 to 12.29% wet wt. Rahaman (1965) has reported protein value of 10.33% in *Donax cuneatus*.

The fat contents of *Meretrix casta* (2.12%) and *Sanguinolaria diphos* (2.00%) are higher than those (0.50-1.89%) mentioned by Venkataraman and Chari (1951) for *Meretrix casta* and 1.35% mentioned by Velloso *et al.* (1951) for *Donax hanleyana*, but are similar to the value of 2.10% reported for *Donax cuneatus* by Rahaman (1965).

The carbohydrate content is remarkably low, being 0.38% in *Meretrix casta* and 0.35% in *Sanguinolaria diphos*. In *Donax cuneatus*, the carbohydrate content ranges from 2.38 to 5.25% (Rahaman, 1965). The glycogen content of *Martesia fragilis* varies between 0.99 and 11.5% wet wt. (Srinivasan and Krishnaswamy, 1963), while in *Martesia striata* it is 1.75-4.1% dry wt. (Nagabhushanam, 1961).

The ash content in *Meretrix casta* (2.19%) and *Sanguinolaria diphos* (3.6%) is higher than that reported by Spector (1956) for clams (2.1% wet wt.) and that recorded by Giese (1969) in the clam *Tivela stultorum* (3.4-7.3% dry wt. i.e., 0.93-2.32% wet wt.). Venkataraman and Chari (1951) have found that the ash content of *Meretrix casta* varies between 0.67-2.31% wet wt. in an annual period.

Seventeen amino acids are present in the free form and fifteen in the bound form in the meat of *Meretrix casta* while in *Sanguinolaria diphos* sixteen amino acids are found in free and bound forms (Table 1). Only one sulphur amino acid, methionine, is present in both species and cysteine has not been detected. The amino acid composition of *Sanguinolaria diphos* differs from that of *Meretrix casta* in the absence of lysine. The number of amino acids present in these bivalves is higher compared to those in other bivalves. *Donax cuneatus*

TABLE 1. *Amino Acids in the tissues of Meretrix casta and Sanguinolaria diphos.*

	Free Amino Acids in		Bound Amino Acids in	
	<i>M. casta</i>	<i>S. diphos</i>	<i>M. casta</i>	<i>S. diphos</i>
Leucine	+	+	+	+
Isoleucine	+	+	+	+
Phenylalanine	+	+	+	+
Valine	+	+	+	+
Methionine	+	+	+	+
Tryptophan	-	-	-	-
Tyrosine	+	+	+	+
Alanine	+	+	+	+
Proline	+	+	+	+
Glutamic acid	+	+	+	+
Threonine	+	+	+	+
Hydroxyproline	-	-	-	-
Arginine	+	+	+	+
Glycine	+	+	+	+
Serine	+	+	+	+
Aspartic acid	+	+	+	+
Asparagine	+	+	-	+
Histidine	+	+	+	+
Lysine	+	-	-	-

+ Detected

- Undetected

contains thirteen amino acids (Rahaman, 1965) and it differs from *Meretrix casta* and *Sanguinolaria diphos* in the absence of threonine, asparagine, valine and methionine and from *Sanguinolaria diphos* in the presence of lysine. *Mytilus edulis*, *Ostrea edulis* and *Anodonta cygnea* which have been reported to contain fifteen amino acids (Florkin, 1966), differ from *Meretrix casta* and *Sanguinolaria diphos* in the absence of serine and asparagine and from *Sanguinolaria diphos* in the presence of lysine.

This report formed part of my M.Sc. dissertation submitted to the Annamalai University, and the facilities provided by the University for carrying out this investigation are gratefully acknowledged. I am grateful to Dr. R. Natarajan, Director, Centre of Advanced Study in Marine Biology, Porto Novo, for suggesting the problem, and to Dr. (Mrs.) Kalyani, for guidance in the biochemical analysis.

I thank Dr. S. Z. Qasim, Director, Central Marine Fisheries Research Institute, Cochin for his encouragement in preparing the manuscript and Dr. K. S. Rao, Assistant Fishery Scientist, Regional Centre of Central Marine Fisheries Research Institute for critically reading it.

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