

areas¹⁻³. However, present results suggest a possible build-up of this 'non-essential' element in the biota of Bay of Bengal, for reasons still unknown.

The concentration factor for each metal, except Pb, was calculated. The concentration factor was highest for Fe (15638) followed by Co (1955), Zn (1042), Ni (442), Mn (358) and Cu (228). According to Bowen¹¹, among cations, the affinity for living matter is in the order tetravalent and trivalent elements > divalent transition metals > divalent group II A metals > univalent group I metals. When the concentration factor was arranged in the decreasing order, the above statement was found to hold good for all elements except Zn.

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Energy Value of Suspended Detritus from Some Stations along the West Coast of India

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Energy content of suspended detritus was determined from the coastal waters of the west coast of India during the 31st cruise (March-April 1978) of *RV Gaveshani*. Percentage contribution of energy by phytoplankton, zooplankton and detritus in total suspended matter amounted to 5.05, 13.8 and 81 respectively. The caloric value of the detritus ranged from 490 to 5094 cal/g dry weight. The results indicated the predominance of detritus over living matter.

Detrital particles generally form the major component of suspended matter in the sea and play an important role in physical, chemical and biological processes¹.

The importance of detritus in the food web has been indicated²⁻⁶. However, information on nutritive value of detritus during its formation in the tropical waters is very limited^{7,8}. The present communication deals with some aspects of the caloric content of suspended detritus.

Water samples were collected from different depths using van Dorn sampler from 7 stations (lat 13° 30' N to lat 10° N) during the 31st cruise of *RV Gaveshani* (March-April 1978) in the Arabian Sea. To quantify the amount of total suspended matter, 4 to 9 l of water sample was filtered through GF/C Whatman filter paper and dried in an oven at 70°C. Chlorophyll *a* was estimated fluorometrically and converted to phytoplankton carbon using the conversion factor given by Tranter⁹. Zooplankton biomass data available as displacement volume/m², collected during the 17th cruise of *RV Gaveshani* (March 1977) from the same area, were used for computing zooplankton carbon values following the conversion factor of Tranter⁹.

Phytoplankton calories were derived from the carbon values using the conversion factor given by Platt and Irwin¹⁰. Zooplankton carbon was converted to caloric value using the conversion factor 1 mg C = 10 calories¹¹. Energy content of total suspended matter was determined by combustion of the dried material in a Parr adiabatic microbomb calorimeter. Detrital calories were obtained by the difference between the total suspended matter calories and phyto- and zooplankton calories. The results given here represent the integrated column production values.

Integrated values of phytoplankton, zooplankton and detrital calories are given in Table 1. On an unit weight basis, the caloric value ranged from 490 to 5094 cal/g dry weight (av. 1601 cal/g dry weight). The mean detrital caloric value recorded in the present study appears to be lower than that reported for Red Sea, Gulf of Aden, Equatorial Atlantic, Gulf of Mexico¹², Menai Straits¹³ and the Laccadive Sea⁸ but higher than that reported for Cochin backwaters⁶ and Zuari estuary⁷.

Table 1—Integrated Energy Values of Phytoplankton, Zooplankton and Suspended Detritus at Different Stations in the West Coast of India

Station No.	Depth range (m)	Energy kcal/m ²		
		Phytoplankton	Zooplankton	Detrital
875	0-50	0.654	2.4	78.646
877	0-50	0.599	1.8	71.851
878	0-50	1.642	9.6	5.858
879	0-45	3.061	1.8	79.188
880	0-45	1.271	1.8	27.383
881	0-37	1.602	2.4	6.765
882	0-30	0.358	1.2	23.75

Percentage contribution of energy by phytoplankton, zooplankton and detritus in the total suspended matter was 5.05, 13.8 and 81.16 respectively. Thus, the major part of the available energy appears to be contributed by the detrital fraction as observed earlier^{7,8}. Saunders¹⁴ also pointed out that in coastal regions, approximately 90% of the particulate matter is detritus.

When the total investigated area ($15.7 \times 10^3 \text{ km}^2$) of the west coast is considered, the distribution of energy would be 20.598×10^9 kcal by phytoplankton, 47.1×10^9 kcal by zooplankton and 658.144×10^9 kcal by suspended detritus.

Chemical analyses indicate that the detritus in the sea is composed of 30% carbohydrate, 70% fibrous material and > 1% lipid¹⁵. Then, in the present study, of the total detrital energy available (658.144×10^9 kcal), 197.443×10^9 kcal is probably contributed by carbohydrates and 460.701×10^9 kcal by fibrous material.

Detrital matter generally includes plant detritus, animal detritus, faeces of heterotrophs and moulted exoskeleton of crustacea. According to Petipa *et al.*¹⁶ in the upper layers of the sea, plant detritus usually is about 8%, animal detritus 10%, faeces 1.2% and exoskeleton 0.03% of the standing stock. If that is applied here, the contribution by the dead plant cells would amount to 1.648×10^9 kcal, zooplankton detritus 4.71×10^9 kcal, faeces about 0.565×10^9 kcal and exoskeleton 0.014×10^9 kcal. From the above it is evident that the major source of detritus in the west coast is not autochthonous but the area being coastal region, it might have originated from terrigenous sources (allochthonous).

Saunders¹⁴ pointed out that in the upper few hundred meters of the oceans, predominance of detritus is a common phenomenon. He attributed it to the fact that freshly formed detritus is not easily assimilated by animals as it is by microorganisms and well formed or decomposed detrital aggregates are less susceptible to bacterial attack. This may be probably the reason for the dominance of detritus over the living biomass observed in the present study as well as in the Laccadive Sea⁸.

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Energy Content of the Wedge Clam, *Donax incarnatus* Gmelin

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Seasonal variations in energy, organic carbon and lipid contents in *D. incarnatus* were studied for 1 yr. Caloric content varied from 2.74 to 5.35 kcal/g dry weight in males; the range of variations in females and indeterminate forms was 3.59 to 5.3 and 3.19 to 5.59 kcal/g dry weight respectively. Variation in the energy content in females was closely associated with the spawning cycle and lipid content.

Clams are found in abundance in the estuaries, backwaters and bays of both east and west coasts of India. Exploited resources of clams from natural populations are > 5000 tonnes, although their potential is very high¹. Earlier studies on the wedge clam *Donax incarnatus* of west coast of India are either restricted to its biology^{2,3} or to oxygen consumption and feeding experiments⁴. McLusky *et al.*³ have reported that the sandy beaches of Goa (Calangute and Colva) are dominated by the *Donax* spp. In this communication seasonal variations in energy content, organic carbon and lipid of *D. incarnatus* are presented.