

Energy values of suspended detritus in Andaman Sea

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Energy content of suspended detritus was determined in Andaman Sea waters during April-May 1988. The caloric content of suspended detritus ranged from 987 to 7040 cal.g⁻¹ dry wt with an average value of 5530 cal.g⁻¹ dry wt. The results indicated the predominance of detritus over living matter and significant correlation between particulate organic carbon and detrital carbon.

The importance of detritus in the marine food chain is well established. It has been shown that in the open ocean, often, energy moves through detrital link rather than the conventional grazer food chain^{1,2}. Detrital particles generally form the major component of the suspended matter in the sea and play a major role in the energy transformations. Information on nutritive value of suspended detritus from Indian waters is meagre^{1,3,4}. The present communication deals with some aspects of the caloric content of suspended detritus.

During the 41 cruise of *ORV Sagar Kanya* (April-May 1988) water samples were collected from different depths (0,50,100,150 and 200 m) using Niskin sampler from 21 stations in the Andaman Sea (lat.6°30'N to 15°N; long.92° 30'-94° 30'E). To quantify the amount of suspended matter, water sample (5 l) was filtered through Millipore filters (0.45 µm pore size) and dried in an oven at 70°C. Chlorophyll *a* was estimated using Turner flurometer and converted to phytoplankton carbon⁵. From carbon values, phytoplankton energy was derived following the conversion factor⁶. Zooplankton biomass, determined as displacement volume was used for computing zooplankton dry weight and carbon values using the factors of Madhupratap *et al.*⁷ and Nair⁸ respectively. Zooplankton carbon was converted to caloric value using the factor⁹ 1 mgC = 10 cal. Particulate organic carbon (POC) was estimated according to Strickland and Parsons¹⁰.

Energy content of total suspended matter was determined by combusting the dried material in Parr adiabatic bomb calorimeter (1200). Detrital calories were obtained by the difference between the total suspended matter calories and phyto- and - zooplankton calories.

Detrital energy varied from 762 to 10879 kcal.m⁻² (Table 1). On unit weight basis, the caloric value ranged from 987 to 7040 cal.g⁻¹ dry wt, with an average of 5530 cal.g⁻¹ dry wt. The range of detrital energy reported by earlier workers² for Andaman waters appears to be low compared to the values reported in the present study. This may be due to the fact that the earlier workers have derived detrital energy using the conversion factor of 1 mg C = 10 cal which is normally

Table 1—Energy values of phytoplankton (P), zooplankton (Z), detritus (D) and total suspended detritus (TSD) at different stations (integrated column values in kcal.m⁻²)

St No.	P	Z	D	TSD
1	4.12	9.90	3467.68	3481.70
2	3.66	7.40	3737.17	3748.23
3	5.14	17.50	761.50	784.14
4	3.37	9.90	5428.31	5441.58
5	5.45	12.40	2960.80	2978.65
6	3.41	12.40	4708.72	4724.53
7	3.97	7.40	1676.83	1688.20
8	2.55	7.40	6092.83	6102.78
9	4.17	8.70	7110.73	7123.60
10	10.68	8.70	6584.07	6603.45
11	4.17	16.10	6138.93	6159.20
12	6.37	7.40	9944.81	9958.58
13	3.72	9.90	10528.06	10541.68
14	3.14	17.30	7929.84	7950.28
15	6.32	17.30	8145.43	8169.05
16	7.30	6.20	10878.78	10892.28
17	12.23	7.40	4997.02	5016.65
18	16.70	12.40	3404.70	3433.80
19	7.57	11.10	3287.42	3306.03
20	5.45	9.90	2499.05	2514.40
21	5.68	5.00	2814.37	2825.05
Mean	5.96	10.56	5385.57	5402.09

used to derive zooplankton calories from zooplankton carbon values, whereas, in the present study the samples were directly subjected to bomb calorimetry. The mean caloric value recorded in the present study is fairly close to values reported from other marine environments¹.

Contribution of energy by phytoplankton and zooplankton was <0.5%, whereas, that by detritus was 99.5%. When the total investigated area of 2.1×10^5 km² is considered, the contribution of energy would amount to 12.5×10^{11} kcal by phytoplankton, 22.2×10^{11} kcal by zooplankton and 11310×10^{11} kcal by suspended detritus. Similar situation of predominance of detritus over living matter was reported for the Laccadive Sea¹. POC ranged from 18.3 to 152.69 g.m⁻². The relationship between POC and chl *a* in the present study was non-linear. However, there was a significant correlation ($r=1$, $P>0.001$) between POC and detrital carbon, suggesting the origin of particulate carbon from non-living.

Dominance of detritus in the open ocean has been explained and the possible source could be the organic pool existing in the ocean¹. It is also possible that in the absence of allochthonous sources, detritus can originate from flakes or floc particles which remain suspended in the water column and enrich the food value¹¹, and they function as microhabitat as well as potential food source for many of the planktonic filter feeders and substrate feeders¹². This organic pool appears

to be far greater than the standing stock of living biomass. It is in this context, that suspended detritus is to be considered ecologically important.

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