Indian Journal of Marine Sciences
Vol. 14, September 1985, pp. 167-168

Distribution of Photosynthetic Pigments & Particulate Organic Carbon in Coastal Waters of Northwestern Bay of Bengal

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Received 3 *December* 1984; *revised received* 29 *July* 1985

Chl *a*, carotenoids, particulate organic carbon (POC), temperature, salinity and *p*H of surface waters of 3 estuarine and 3 near shore areas of the northwestern Bay of Bengal are presented. Salinity showed negative correlation with chl *a* ($r = -0.914$) and POC ($r = -0.945$).

Reports on the distribution of photosynthetic pigments and particulate organic carbon (POC) from Indian coasts are relatively few, and especially so for coastal waters of the Bay of Bengal. Some information is available[1-4] dealing with distribution of chlorophyll *a* and primary productivity in a general way. In this communication phytosynthetic pigments, POC, temperature, salinity and *p*H from 6 stations, viz. Diamond harbour (st 1) Haldia (st 2) off Sagar island (st 3), Sand heads (st 4), New Moore island (st 5) and Paradeep (st 6) are reported.

Surface waters were collected during 141 cruise of *R V Gaveshani* (27 Sept. to 5 Oct. 1984) at 6 h interval for 24 h, corresponding to high and low tide periods, for the estimation of the above parameters. Salinity was estimated by Knudson's method and plant pigments and POC by spectrophotometric methods[5]. No correction has been made for pheopigments in obtaining chl *a* concentration.

Results are given in Table 1. St 1 and st 2 had mean salinity of 0.07×10^{-3} and 0.78×10^{-3} respectively. Chl *a* (5.55 and 3.95 mg m^{-3} for st 1 and 4.41 and 4.37 mg m^{-3} for st 2), carotenoids (1.86 and 1.75 MSP m^{-3} for st 1 and 1.37 and 0.94 MSP m^{-3} for st 2) and POC (3.96 and 3.58 mg l^{-1} for st 1 and 5.23 and 4.21 mg l^{-1} for st 2) were relatively high during low tides than, chl *a* (2.48 and 2.32 mg m^{-3} for st 1 and 3.75 and 3.71 mg m^{-3} for st 2), carotenoids (1.47 and 0.40 MSP m^{-3} for st 1 and 0.18 and 0.15 MSP m^{-3} for st 2) and POC (3.1 and 3.0 mg l^{-1} for st 1 and 3.5 and 3.3 mg l^{-1} for st 2) values observed in high tides.

Waters around st 3 had salinity of 4.69×10^{-3} and 6.94×10^{-3} during low and high tides respectively. The waters of this area were comparatively more alkaline (*p*H 8.03 to 8.3) and less turbid (seston, 30 to 450 mg l^{-1}). Concentration of chl *a*, carotenoids and POC were low when compared to other stations. High values of chl *a* (0.84 and 0.79 mg m^{-3}) and POC (4.4 and 2.8 mg l^{-1}) noticed during ebb periods indicate that the organic matter introduced by land run-off[6] appears to be the chief source of POC and chl *a*.

The surface waters at sts 4 to 6 were more alkaline (*p*H > 8.4) and mixomesohaline (sal 7.69 to 12.55 $\times 10^{-3}$). Peak values of chl *a*, carotenoids and POC were reported during the morning (0630 hrs) and evening (1830 hrs) collections, which could be

Table 1—Surface Distribution of Photosynthetic Pigments and POC and Hydrographic Parameters at Various Stations

(Range values are given in parentheses)

St	Location	Temp. (°C)	*p*H	Salinity ($\times 10^{-3}$)	Seston (mg l^{-1})	Chl *a* (mg m^{-3})	Carotenoid (MSP m^{-3})	POC (mg l^{-1})
Diamond harbour	22°, 11.2'N	25.30	8.13	0.07	303.3	3.55	1.37	3.41
	88°, 09.8'E	(20.6-31.4)	(7.97-8.17)	(0.04-0.09)	(250-360)	(2.32-5.55)	(0.4-1.86)	(3.00-3.96)
Haldia	22°, 00.4'N,	29.10	7.97	0.78	460	4.06	0.66	4.06
	88°, 04.2'E	(24.5-32.0)	(7.86-7.98)	(0.02-1.40)	(400-540)	(3.71-4.41)	(0.15-1.37)	(3.3-5.23)
Sagar island	21°, 42.1'N,	30.01	8.17	5.44	170	0.74	0.08	2.06
	88°, 01.1'E	(28.9-31.0)	(8.03-8.30)	(4.69-6.94)	(30-450)	(0.64-0.84)	(0.01-0.12)	(0.49-4.40)
Sand heads	20°, 53.5'N,	30.20	8.61	8.69	2.67	0.18	0.03	0.37
	88°, 24.0'E	(29.9-30.5)	(8.58-8.64)	(8.19-9.19)	(2.5-3.0)	(0.10-0.20)	(0.02-0.05)	(0.30-0.45)
New Moore island	21°, 05.7'N	29.65	8.66	7.69	5	0.79	0.25	0.46
	88°, 58.5'E	(29.4-29.9)	(8.45-8.89)	(7.04-8.35)	(4.2-5.8)	(0.75-0.84)	(0.21-0.31)	(0.44-0.47)
Paradeep	20°, 18.1'N,	29.16	8.47	12.55	1	0.14	0.04	0.15
	87°, 04.6'E	(29.0-29.5)	(8.43-8.50)	(12.19-12.90)	(0.8-1.2)	(0.13-0.15)	(0.01-0.5)	(0.11-0.17)

attributed to the surface aggregation of phytoplankton by vertical migration. Chl *a*, carotenoids and POC values of st 5 were high compared to those of sts 4 and 6.

The surface salinity all along the east coast of India is low during Sept.-Nov. due to enormous influx of fresh water into the Bay of Bengal[7]. The salinity values at sts 1 and 6 are within the values reported earlier.

Salinity showed negative correlation with chl *a* and POC ($r = -0.914$ and -0.945 respectively). Low saline and more turbid waters were usually associated with high photosynthetic pigments, and POC, which could be attributed to the presence of inactive chl *a* and POC in organic detritus introduced through land drainage and stirring up of bottom sediments[6,8]. Qasim and Reddy[9] have reported similar high but inactive chl *a* in the Cochin backwaters during monsoon months.

One of the authors (SKS) is indebted to the Director, NIO, Goa for giving an opportunity to participate and use facilities of *R V Gaveshani* and to the Department of Ocean Development, New Delhi for the award of a fellowship.

References

1 Bhattathiri P M A, Devassy V P & Radhakrishna K, *Mahasagar—Bull Natn Inst Oceanogr*, **13** (1980) 315.
2 Devassy V P, Bhattathiri P M A & Radhakrishna K, *Mahasagar—Bull Natn Inst Oceanogr*, **16** (1983) 443.
3 Krishnamurty K & Purushothaman A, *J Mar Biol Assoc India*, **13** (1971) 271.
4 Qasim S Z, *Indian J Mar Sci*, **7** (1978) 259.
5 Strickland J D H & Parsons T R, *A practical handbook of seawater analysis*, Bull No. 167 (Fish Res Bd Can) 1968.
6 Kamat S B, *Indian J Mar Sci*, **5** (1976) 232.
7 Ganapati P N & Rao T S S, *J Mar Biol Assoc India*, **1** (1954) 229.
8 Gopinathan C P, Ramachandran Nair P V & Kesavan Nair A K, *Indian J Fish*, **21** (1974) 501.
9 Qasim S Z & Reddy C V G, *Bull Mar Sci Gulf Caribb*, **17** (1967) 95.