ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 05, pp.30310-30315, May, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

PHYSICO – CHEMICAL PARAMETERS OF MARINE WATER FROM THONDIYAKADU COAST OF SOUTH EAST COAST OF INDIA

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ARTICLE INFO

Article History:
Received 18th February, 2016
Received in revised form
26th March, 2016
Accepted 09th April, 2016
Published online 10th May, 2016

Key words:
Marine Ecosystem,
Physico-Chemical
Parameters.

ABSTRACT

The present investigation suggests that the influence of metrological and Physico-chemical factors on the seasonal variation of cyanobacterial diversity were performed. Marine water samples were collected at monthly wise from Thondiyakadu coast for one year from July 2013 to June 2014 and Physico-chemical Parameters such as rainfall, atmosphere temperature, water temperature, pH, salinity, dissolved oxygen; Nitrate and total phosphorous were analyzed. Maximum rainfall was September may record during the period of 2013 to 2014. Maximum pH was June and July was recorded in the study. The results were discussed.

Citation: Bhuvaneshwari, T. and Muruganandam, A. 2016. "Physico – chemical parameters of marine water from thondiyakadu coast of south east coast of India", *International Journal of Current Research*, 8, (05), 30310-30315.

INTRODUCTION

Physico – chemical characters of the environment determine the nature and distribution of flora and fauna of a particular ecosystem. One of the characters is imbalance in the food chain and affects the entire ecosystem or sometimes leads to toxicity. Coastal areas are undergoing dramatic changes due to intensive pollution activities, such as tourism pollution, sand extraction and destruction of sand dunes, Mangrove destruction indiscriminate pisciculturing and mining. A prolonged monitoring of seasonal occurrence plankton diversity is essential for a deep understanding of how the marine environment changes in response to the potential economical progress and anthropogenic activities in developing countries like India.

MATERIALS AND METHODS

Marine water was collected from Thondiyakadu coast (Lat $10^{o}46^{o}$N, Long $79^{o}51$E). Collections were made for one year from July 2013 to June 2014 at monthly wise during low tide period from inertidal and sub tidal region of the study areas.

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Then the marine water samples were collected in polythene bags then they are transferred to Erlennyer flask. The rainfall data were obtained from the meteorological center of Muthupet, Thiruvarur District. The atmospheric temperature and water temperature were measured using by thermometer. The electronic pH pen was used for measuring pH from sea water, and salinity by ATAGO hand refractometer. Dissolved oxygen and nutrients were estimated by following the method (Strickland and Pearsons, 1972).

RESULTS AND DISCUSSION

The physico chemical data's were collected from marine of Thondiyakadu coast, south east coast of India. Rainfall data from study site (Fig 1) varied from 1.4 to 17.2mm during the study period and minimum of 1.4mm was recorded during pre-monsoon in July, 2013 and maximum of 202mm in November 2013. The rainfall was totally absent in the month of March, 2014. A similar observation was made by Gulshad Muhamed *et al*., (2006) in the Minicoy Island with high sea weed biomass in lagoon side during the post monsoon month of study period. Atmospheric temperature ranged from 28^{o}C to 31^{o}C during the period (Fig 2) and a minimum of 28^{o}C to 31^{o}C during study period (Fig 3) and a minimum of 28^{o}C was recorded during November, December 2013 and maximum 31^{o}C was recorded during the month of May 2014.

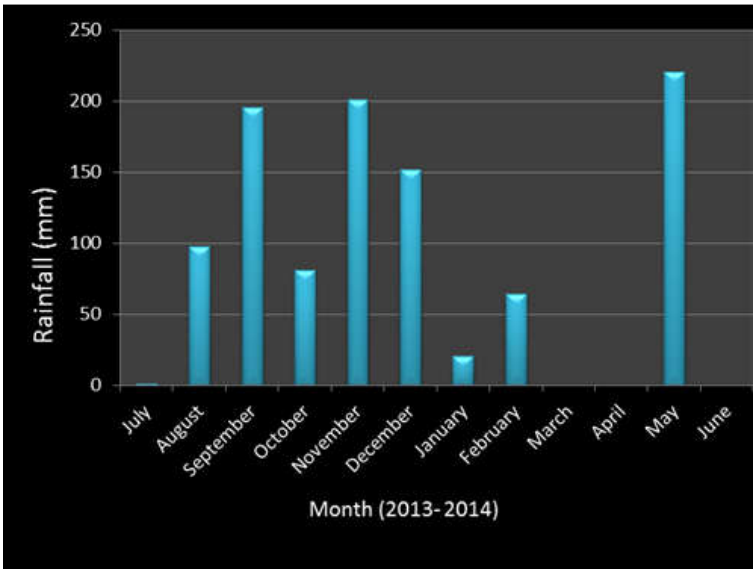

Fig. 1. Physico – chemical parameters of rainfall at the study site

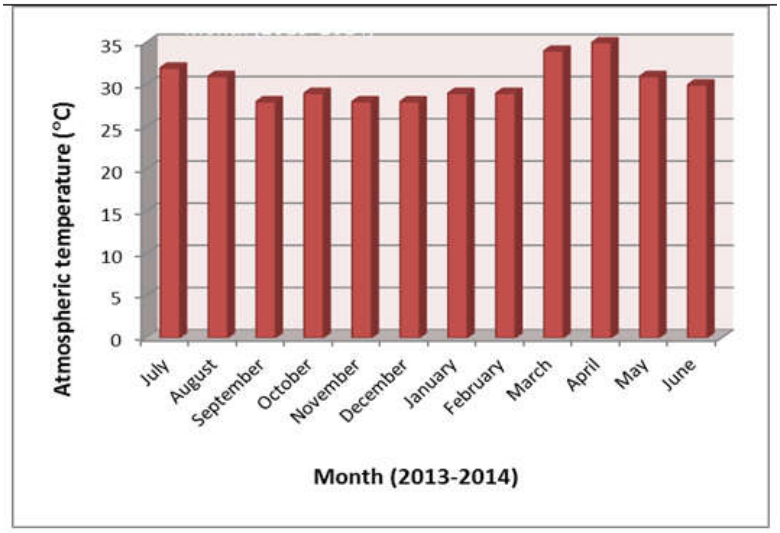

Fig. 2. Physico – chemical parameters of Atmosphere Temperature (^{o}C) at the site

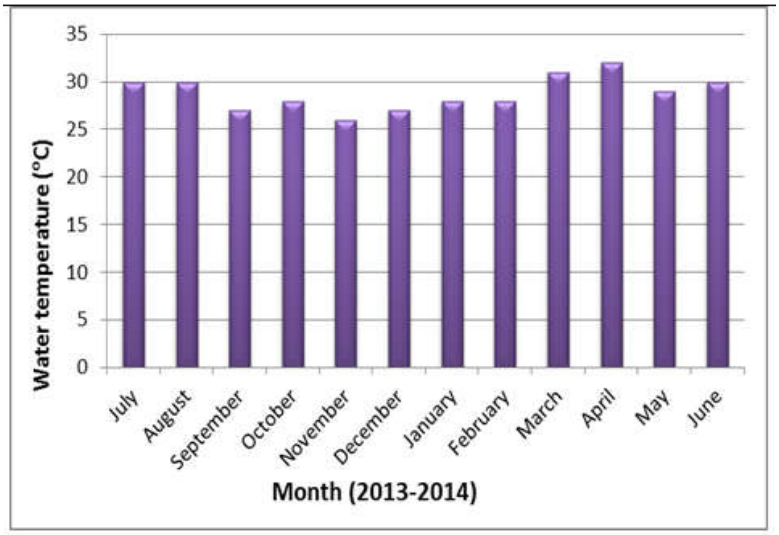

Fig. 3. Physico – chemical parameters of Water Temperature (^{o}C) at the study site

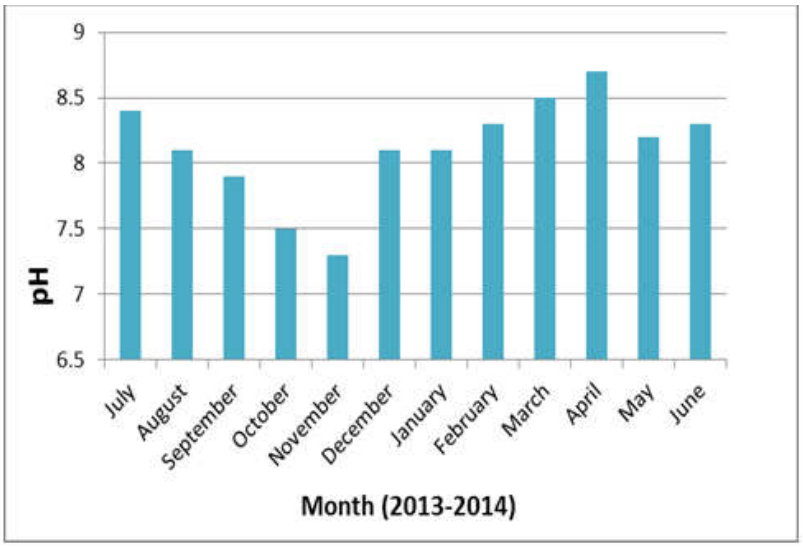

Fig. 4. Physico – chemical parameters of pH at the study site

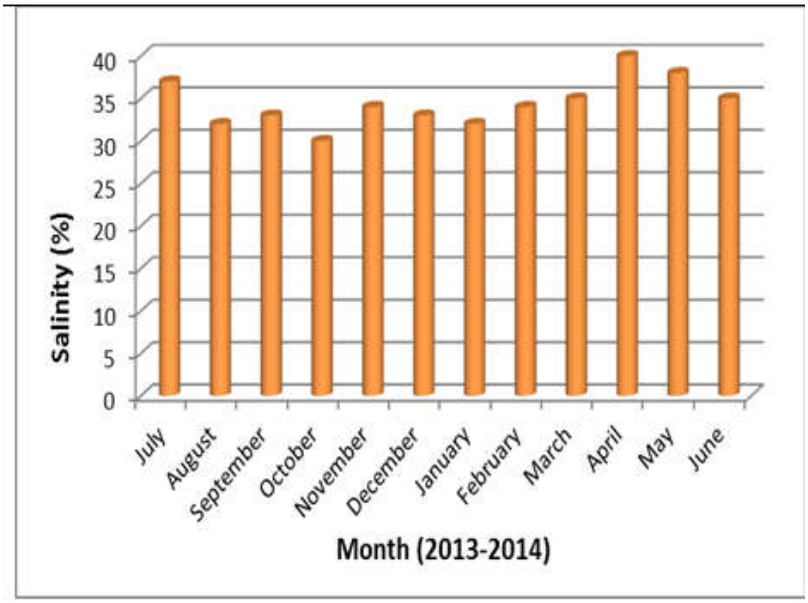

Fig. 5. Physico –chemical parameters of Salinity% at the study site

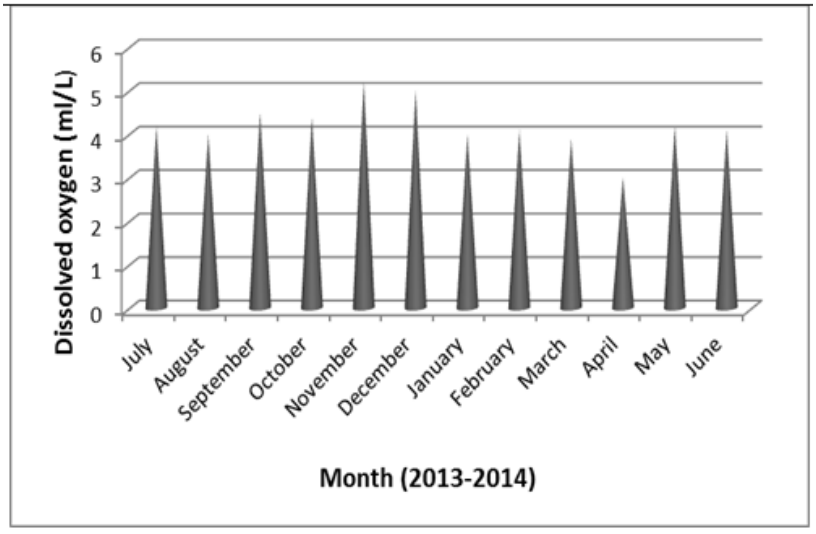

Fig. 6. Physico – chemical parameters of Dissolved oxygen (ml/L) at the study site

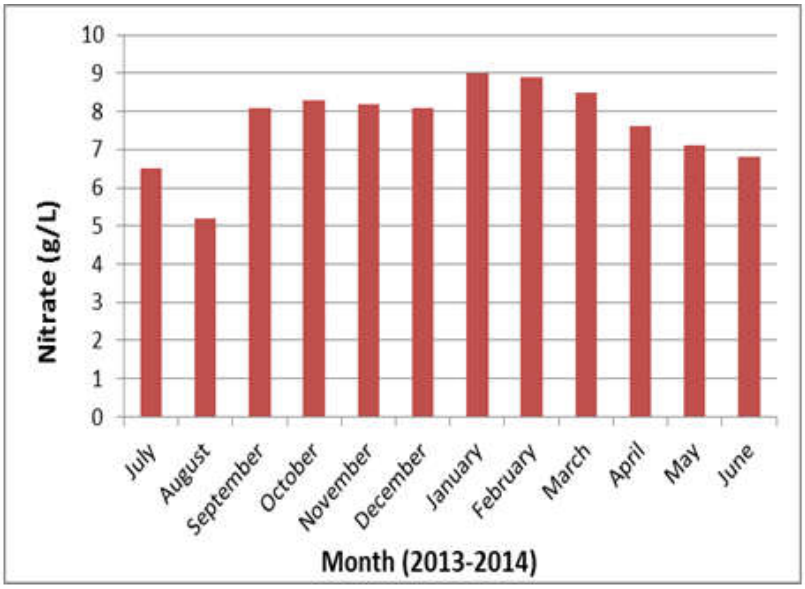

Fig. 7. Physico – chemical parameters of Nitrate (g/l) at the study site

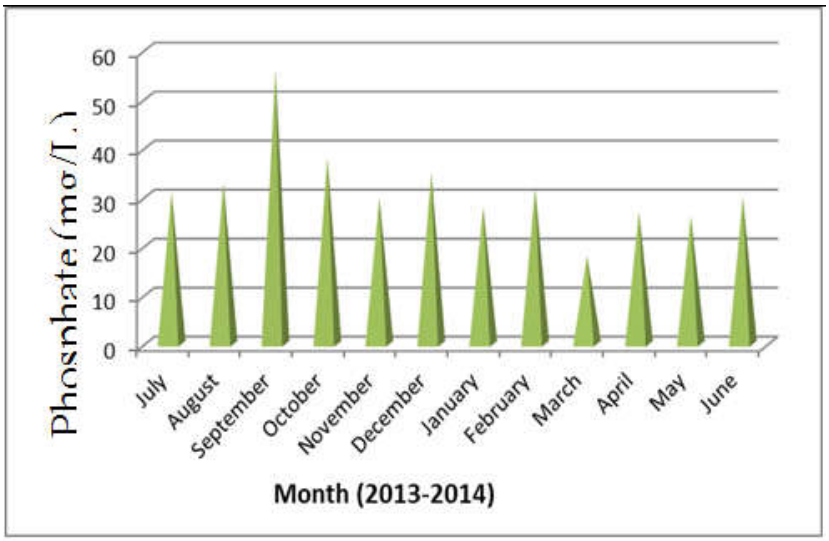

Fig. 8. Physico – chemical parameters of Phosphate (g/l) at the study site

Table 1. Physico chemical properties of Thondiyankadu coast water sample

S.No.	Monsoon	Month	July 2014 - June 2015							
			Rainfall (mm)	Atmosphere Temperature (^{0}C)	Water Temperature (^{0}C)	pH	Salinity (%)	Dissolved Oxygen (ml/L)	Nitrate (g/l)	Phosphate mg/l
1	Pre monsoon	July	13.4	29.9	29	8.3	36	4.1	6.4	32
2		August	89.4	30	30	8.2	33	4	6.1	33
3		September	76.6	28.8	27.8	7.8	31	4.3	6.2	48
4	Monsoon	October	304.9	29.9	27	7.6	30	4.2	8	36
5		November	327.4	29.2	26.6	7.7	31	4.4	8.4	30
6		December	261.6	28.9	27.9	7.5	29	4.4	8.7	34
7	Post monsoon	January	0	30.4	29.3	8.1	33	5.8	9	29
8		February	0	29.9	28.8	8.2	32	5.6	8.5	30
9		March	189.2	35.1	32	8	31	4.9	8.3	19
10	Summer	April	116	37.3	33	8.5	37	4.7	7.2	28
11		May	132.2	32.4	34	8.4	35	5.1	7	28
12		June	77.6	31.9	31	8.2	32	5	6.5	31

Surface water temperature ranged from 28°C to 31°C during study period (Fig 4) Minimum temperature 28°C was recorded during November and December 2013 and Maximum 31°C during April and May 2014. These findings correlated with that of Sarala devi *et al.,* 1979 and Beardall *et al.,* 1998. The decrease in water temperature increased the solubility of oxygen in water as observed by Hutchinson, 1975; Wong, 1979 and Nedumaran *et al.,* 2001. pH values varied from 7.2 to 8.7 with minimum value 7.2 was recorded in September, November and December 2013(Fig 5). The high pH recorded during summer season could be due to the increase in temperature coupled with high salinity (Backmeno, 1981). These finding correlate with that the results of Nagarajan and Gupta, 1983; Tiwari, 1990 and Xaiver *et al* 1999. Salinity value ranged from 30-37% (Fig 6) with minimum value 30% was recorded during August 2013 and January 2014 and Maximum 37% during April, 2014. Similar observations were reported by Padmavathi and Sathyanarayanan (1999) and Govindasamy *et al.,* (2000) with direct relationship between salinity and pH as shown by Bhave and Borse (2001). Dissolved oxygen concentration varied between 3.0 to 4.8 ml/L (Fig.7) with minimum value 3.0 was recorded during April and May 2014. Maximum 4.8 during December 2013. Dissolved oxygen content of a particular water body is greatly influenced by temperature, photosynthetic activity and respiration (Tiwari, 1990). It showed inverse relationship with the temperature (Olsen and summer Field, 1997). Goldman and Horne (1983) ; Bahara, (1998); Ramaiah and Ramaiah (1998) ; Nedumaran *et.al* (2001) and Bhave and Borse (2001).

Nitrate concentration ranged from 4.3 to 9.3 µg (Fig.8). The minimum nitrate content in August 2013 as (4.3µg/L) and Maximum nitrate content in October 2013 (9.3µg/L). These finding agree with the observations made by Qasim (1980), Murugan and Ayyakkannu (1993) and Jagadeesan (1986) in Cochin Backwater and Uppanar back waters of Coleroon estuary. Total phosphorous concentration varied between 1.8 and 4.3µg/g (Fig.9) Minimum concentration (1.8µg/g) in March, 2013 and Maximum concentration (4.3µg/g) in October, 2013 were recorded in phosphate concentration increased from summer to post-monsoon period and this increase may be due to liberation of inorganic phosphate (under high oxygen Concentration) from freshwater in flow in the river (Chandran and Ramamoorthy 1984, Jagadeesan, (1986) Das *et.al.,* (1997). Generally the growth and composition of Cyanobacteria are governed by the physicochemical and biological parameters as similar reports have been published froth Maharastra coast by Dhargalkar *et.al.* (2001).

Nutrients such as nitrate and inorganic phosphate were abundant during monsoon due to moonsonal flow of fresh water and land runoff. A decrease nutrient level during summer and post-monsoon was observed. This might be due to utilization of the above nutrients by planktons. These changes in the occurrence of plankton observed in this study are due to prevailing hydrographic and metrological conditions. Temperature, salinity, current substance and tidal change are also major abiotic factors which influence the plankton species composition and seasonal abundance (Agadi and Untawale, 1978).

Acknowledgement

The authors are thankful to Dr. A. Muruganandam, PG and Research Department of Botany, M.R.Govt. Arts College, Mannargudi.

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