

Assessment of water quality of Kalamb beach, Nallasopara

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Abstract

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The main beaches in the Mumbai are studied by the researchers and I stay in Nallasopara, I felt it is very necessary to explore the aspects of this beach. As I after visit this beach to collect water samples, algal collection, shell collection. I found out the unexplored wealth of biodiversity.

The Present Study involves the Analysis of water described by its Physical, Water Quality in Terms of Physico-chemical parameters of kalamb beach one of the cleanest beaches .

The Vasai-Virar Sub-region (VVSR) is bounded on the north by the Vaitarna River, on the south by the Vasai creek and on the west by the Arabian Sea.

The Water samples were immediately brought in to Laboratory for the Estimation of various Physico -chemical parameters, and pH were recorded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other Parameters Such as DO, Free CO₂, Hardness, Alkalinity, Phosphate and Nitrate were estimated in the Laboratory by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5 Model) (Trivedy and Goel,1986, APHA 1985).

KEYWORDS :- water quality ,Nallasopara, physio- chemical parameters,Kalamb beach

Introduction:

From last few years, untreated effluents from small scale as well as large scale industrial sewage are discharged deliberately or accidently in sea. There is a large impact of urbanization and agricultural activities which add up the pollution level and show a remarkable change in the environment.

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The intrusion of salty seawater into wells is a ground water pollution problem in many coastal cities and towns. India is fortunate enough to be bestowed with a long coastline of bout 5000km and a fairly bright sunshine for about 6-9 months. Major constituents of the seawater are sodium chloride. Besides there, other salts such as CaCO₃, CaSO₄,

MgSO₄, MgCl₂ and KCl are also present. Minor constituents are iron oxide and magnesium carbonates. Off shore waters

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So, I thought of doing research on the quality of water from this beach to check the pollution level if any. To identify and define the hydrological processes and phenomena directly concerned with the means of entry, distribution and self-purification of pollutants in surface and groundwater;

To review the known effects of such pollutants on any aspect of these processes and phenomem

Sopara was known as Shurparaka in ancient time. Sopara was a big trading centre and the harbour was in today's Gass village. It was known as Ophir and some of the trading which took place in the 3rd century with Middle East (now Israel) the wood (especially Teak Wood) supplied in Middle East was used in the Church of the Nativity in Bethlehem. It is still there in that Church. Vasai-Virar has four stations Naigaon, Vasai Road, Nala Sopara, and Virar on the Mumbai suburban railway's Western Railway line.

The town of Sopara (Ophir) (the present-day Gass) was a centre of the Indian Ocean trade going in Roman times, but later when its harbour was since silted up, trade shifted to Vasai, which traded in horses, fish, salt, timber, and quarried basalt and granite, and was a shipbuilding centre. Vasai came under the control of the Gujarat Sultanate in the 15th century.

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MATERIALS AND METHODS

The Water Samples from Kalamb beach were collected from two different stations in the morning hours between 10 to 12 am in Polythene bottle regularly for every season. The Water samples were immediately brought in to Laboratory for the Estimation of various Physico -chemical parameters, and pH were recorded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other Parameters Such as DO, Free CO₂, Hardness, Alkalinity, Phosphate and Nitrate were estimated in the Laboratory by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5 Model) (Trivedy and Goel,1986, APHA 1985).

The aim of the present study is to determine the extent of ground water contamination and seawater intrusion around Nallasopara coastal area by taking water samples from 1km and 5km away from the seashore. For this study, physico-chemical analysis was

done with the ground water samples collected from two different places around the coastal area.

Results and Discussion

A) Climate

The Vasai-Virar Sub-region (VVSR) is bounded on the north by the Vaitarna River, on the south by the Vasai creek and on the west by the Arabian Sea. The climate of the Vasai Virar Sub-region can be described as hot-humid with moderate seasonal fluctuations of temperature. Due to a long coast-line and high relative humidity the variations are not significant.

B) Water Temperature

Generally, the weather in study area is quite cool, however the water temperature plays an important factor which influences the chemical, bio-chemical characteristics of water body. The maximum temperature of 34 °C was recorded in summer and a minimum of 14 °C was recorded in winter in the year 2014-15.

The humidity was found to range from 50-80% through -out the year.

Analysis of Water Quality Using Physico- Chemical Parameters:

a) Colour :- the colour shows fluctuations from slight green to light green to blue.

b) Odour :- Ammoniac due to human activities.

c) Turbidity:- The turbidity of water fluctuates from 15 to 25 NTU. The maximum value of 25 NTU was recorded in the month of June , it may be due to monsoon , decrease in the water level and presence of suspended particulate matter and minimum value of 15 NTU in the month of November.

d) pH :- pH was alkaline values ranges from 8 to 9.9. The maximum pH value 9.9 was recorded in the summer and minimum 8 in Monsoon .Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer month (Kamble, S. M. et al.,). The factors like temperature bring about changes the pH of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical condition (Karanth, 1987; Tiwari et al., 2009).

e) Dissolved Oxygen:- The value of DO fluctuates from 6.2 mg/l to 18mg/l. The maximum values 18 was recorded in summer and minimum values 6.2mg/l in the monsoon. The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing CO₂ and giving off oxygen. This possibly accounts for the greater qualities of O₂ recorded during summer. (Krishnamurthy R., et al, 1990)

f) Free Carbon dioxide :- The value of free CO₂ ranges from 0.9 mg/l to 7.8 mg/l. The maximum value 7.8mg/l was recorded in winter and minimum value 0.9mg/l in the summer . This may be depends upon alkalinity and hardness of water body.

g) Hardness :- The value of hardness fluctuates from 1410 mg/l to 1987 mg/l. The maximum value 1987 was recorded in summer and minimum value 1410 in the monsoon . (Hujare, M. S, 2008): was reported total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water.

h) Alkalinity:- Total alkalinity ranges from 114 mg/l to 264 mg/l the maximum value 264 mg/l was recorded in the summe and minimum value of114 mg/l in the winter. The alkalinity was maximum value in April (summer) due to increase in bicarbonates in the water. Hujare, M. S. 2008.

i) Salinity:- The values of chlorides range from 28 mg/l to 35.4 mg/l. The maximum value 35.4 mg/l was recorded in the summer and minimum value 28 mg/l in the monsoon. In the present study maximum value of chloride reaches in summer (Swarnalatha and Narsing rao, 1990).

j) Phosphate :-The value of phosphate fluctuates from 1.8 mg/l to 4.5 mg/l. the maximum value 4.5mg/l was recorded in the monsoon and minimum value in the winter. The high values of phosphate in monsoon is mainly due to rain.

k) Nitrates :- The values of nitrate ranges from 1.3 mg/l to 8.4 mg/l. the maximum value 8.4 mg/l was observed in the monsoon and minimum of 1.3 mg/l in winter season.

l) conductivity :- the conductivity ranges from 5.2×10^4 to 8.2×10^4

m) COD :- The COD is a rapid & precise method for determination of aggregate organic matter The value ranges from 5 to 6.8 mg/l.

n) BOD :- The value ranges 16 mg/l to 28 mg/l. The BOD test measures the strength of the wastewater by measuring the amount of oxygen used by the bacteria as they stabilize the organic matter under controlled conditions of time and temperature.the high range was seen in monsoon.

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