RELATIONSHIP BETWEEN PHYSIOCHEMICAL PARAMETERS AND ALGAL BIODIVERSITY OF BHIMA RIVER

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ABSTRACT
Bhima River, which is situated at the boundary of Daund, Pune District of Maharashtra . The Present investigation was undertaken to study of physio-chemical characteristics of Bhima River with respect to the algal production.Bhima river are highly polluted due to discharge of domestic and industrial waste . The physiochemical aspects of water pollution of Bhima river such as Temperature, PH, Total Alkalinity , Dissolved oxygen ,Biological Oxygen Demand , Chamical Oxygen Demand were analyzed. The pollution status of river is affecting aquatic Life.

KEYWORDS: Bhima river, diversity, algae, water pollution, BOD, COD, etc.

INTRODUCTION
Potable water is defined as the water, which is suitable for human consumption. Due to the presence of various chemical compounds and human activities water gets polluted. Water is the most vital resource for all kinds of life on this planet. Without clean water neither human nor environment, which sustain them can survive. To safeguard the long term sustainability of water resources the quality of the water needs to be monitored. Degradation of water quality is measured in terms of the intended use of water, effect on public health or ecological point of view a pollutant is any biological, physical or chemical substance in which an identifiable excess is known to be harmful to other desirable living organism.
Water is one of the most important natural resources. Life on this planet is believed to be evolved in and around water. Water is equally vital for the growth of plants, agriculture development and industrial uses. The measurement of the productivity and energy of any water body needs full assessment of the physic-chemical and biological characteristics. The physic-chemical characteristics are altered due to metabolic activities of the

aquatic organisms.Generally the studies on the water quality of the researchers throughout Maharashtra (Sarode and Kamat, 1984 and Kumavat and Jawale, 2003). But less attention has been paid to the remote areas of north Maharashtra specially Satpuda region from which this river originates. Therefore this problem was selected in order to study the rivers of south Maharashtra. It originates in Bhimashankar of Pune district of Maharashtra.

MATERIALS AND METHODS
Fortnightly water samples were collected over   a period of two years from January 2010 to December 2012 from two sampling stations F1, F2 & F3 . All collected samples were analyzed for their physico -chemical parameters following the standard methods (A.P.H.A., 1989 and Manivasakam, 1996).Temperature, pH and Free Carbon dioxide were estimated on the spot in the field itself. Dissolved Oxygen was fixed on the spot itself. For estimation of other physic-chemical parameters, water samples were brought to the laboratory in icebox and were preserved by refrigeration at 4^0 C. A quantitative and qualitative study of planktons was also made.

TABLE 1: Physico-chemical characteristics of water of Bhima river near Danud at sampling stations

Sr No.	Parameters	Unit	Limit of WHO	Sample Station (F1)	Sample Station (F2)	Sample Station (F3)
1	Temp	(0C)	-	28.5	29.0	28.2
2	PH		6.5-9.00	7.1	7.6	7.9
3	Total Dissolved Solids	Mg/litre	500	587	520	560
4	Dissolved Oxygen	Mg/litre	>4	4.1	4.3	4.9
5	Free CO_2	Mg/litre	10	9.0	10.3	8.6
6	Total Hardness	Mg /litre	300	217	248	225
7	Total Alkalinity	Mg /litre	200	190	175	182
8	Calcium Hardness	Mg /litre	100	35	41	38
9	Chlorides	Mg /litre	250	48	33	41
10	Salinity	Mg /litre	250	104	128	125

RESULTS & DISCUSSION
All the results are an average of the data collected at three stations *i.e.* F1, F2 & F3. Depending upon the season, solar

radiation and other climatic conditions, temperature varies considerably. In the present study, water temperature ranges between 28.2 to 29.0. These findings co-relates

with that of Bobdey (2002), Sedamkar and Angadi (2003) and Surve *et al*. (2004). From present investigation it can be concluded that, the water temperature was closely related with the ambient temperature (Pophali *et al*., 1990). pH is the scale of intensity of acidity and alkalinity of water and measures the concentration of hydrogen ions. pH regulates the enzyme activities and other physiological processes like respiration (Odum, 1971). The pH was found to be varied from 7.1 to 7.9. It was found to be alkaline in nature all the stations. Sivakumar *et al*. (2002) and Prapurna and Shishikant (2002) recorded similar results. In the present investigation maximum pH was the recorded during summer and minimum during winter at both the stations. Shaikh and Yeragi (2003) and Sharma and Yadav (2003) recorded similar findings. Dissolved oxygen is one of the important parameter in water quality assessment. All living organisms are dependent upon oxygen to maintain the metabolic processes. The Dissolved oxygen was found to be in the range of 4.1 mg/1. To 4.9 mg/1. The concentration of Dissolved oxygen was maximum in winter and minimum in summer. This findings co-rrelates with that of Pendse *et al*. (2000) and Kulkarni *et al*. (2002). Dissolved oxygen showed significant inverse relationship with that of Pendse *et al*. (2000) and Kulkarni *et al*. (2002). Dissolved oxygen showed significant inverse relationship with the temperature. Goldman and Horne (1983) and Bahura (1998) have also recorded such relationship. The present study showed direct relationship of Dissolved oxygen and plankton i.e. when Dissolved oxygen was maximum, the plankton population was also maximum. Such relationship has also been recorded by Madhwal *et al*. (1983).

Carbondioxide
Carbondioxide is vital in the life of plants and microorgnisms. It is produced as a result of respiration of aquatic organisms. The Carbondioxide values were observed in the range of 8.6 mg/1. to 10.3 mg/1. In the present investigation maximum free Carbondioxide was recorded at all the stations. Dwivedi and Pandey (2002) noted similar results.

Total Alkalinity
The total Alkalinity of water sample ranges from 175 to 190mg/L. The value of Alkalinity provides an idea of material salts present in water .present study indicates presence of basic sodium and potassium salts due to methyl orange Alkalinity. Value of phenolphthalein Alkalinity also found up to 5km/l indicating presence of hydroxyl ion Similar result were reported by Misra (1991) Yogesh Shastri (1999) Purandara *et al.* (2003) and sharma and sarang (2004) stated that the water in the area was slightly Alkalinity.

Total hardness
It is caused by carbonate and bicarbonate ions .It has no known effect on human health. In present study total hardness contact of water sample were within permissible limits i.e. 219 to 248 mg / l .The limit of total hardness in drinking water is fixed to be 300 mg /l Similar observation were by Singh (1992)worked on water quality index of major river of punepurendara *et al*. (2003) and Regina and Nabi (2004).

Ca Hardness
The limit o calcium magnesium in drinking water is fixed to be 100mg/l. All the water samples shows calcium hardness within desirable limit. In the present investigation the concentration of calcium ranges between 35 to 41mg /lit. These result were within the permissible range .Same results were reported by Dubey (1997) Swarnalathapaka and Narsingrao (1997) and Sedamkar and Angadi(2003)

Chloride
Excessive chlorides give the water an objectionable salty taste and give laxative effect to human beings concentration of chloride is found in prescribed limit i.e 250mg /l. Concentration of Chloride of all water samples were found within prescribed limits. In the present investigation the range of Chloride concentration ranges between 33 to 48mg/lit .The chloride concentration ranged from 17 to 94mg/lit in tube well water reported by Abubakaar *et al* (2004). He stated that the results were found between the range of present study .Similar observations were also made by Sharma and Gupta (2004) and Motisharma (2004).

Salinity
The Salinity of all the water samples was found within prescribed limits of WHO .In the present investigation amount of Salinity ranges between 104 to 128 mg /lit Salinity themselves don't perform any hazards with respect to water quality but behave as a very good indicator of pollution .Salinity directly effect on the taste of water .Klein (1975)observed a direct correlation between chloride concentration and pollution load .Similar result were reported by Purandra.et.al(2003),Gare.et.al (2004).Manna and Das (2004) .and Radhika.et.al(2004)

Total Dissolved Solid
Above 500mg/1 TDS is not suitable for drinking purpose. But present investigation indicates high range in ground water. It is not suitable for drinking purpose is absence of alternate sources as it is below excessive limit of ICMR. In the present investigation the total dissolved solids ranges between 520 to 587mg/lit. Highest concentration of total dissolved may reduce the clarity of water which contributes to an increase in the water temperature. Similar reports are reported by Swarnalathapaka and Mule (2003). The values of Physico-chemical characteristic of ground water samples are represented in Table No. 1.
In the present study the higher values of planktons (total number of organisms) were noted at all the stations. In the present study the range of planktons was increasing Co_2 concentration, Low temperature and higher dissolved oxygen enhances the production of planktons (Moitra and Bhattacharya, 1965 and Subrahmanyam and Sen Gupta, 1965).

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