



PHYSICO-CHEMICAL FEATURES OF KALI RIVER, KARWAR, WEST COAST OF INDIA

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Abstract

The present study was carried out for the physico-chemical characteristics of a Kali river from October 2009 to March 2010. The parameters in this study ranged between Air temp., 12.7°C to 25.3°C; Water temp. 11.3°C to 19.6°C; Transparency 52.6 cm to 76.8 cm; Turbidity 14.4 JTU to 20.7 JTU; pH 7.1 to 8.3; Total solids 492.87 mg/l; Free CO₂ 0.98 to 9.6 mg/l; Dissolved oxygen 9.66 mg/l to 11.75 mg/l; BOD 1.20 mg/l to 4.42 mg/l and chlorides 14.89 mg/l to 21.65 mg/l for the period of study.

Keywords: Physico-chemical, Kali River, Transparency, Dissolved oxygen, Karwar

Introduction

Quality of potable water is an important as its quality. Various physical, chemical and biological factors are the variables that govern the quality of drinking water. Although, the numbers of parameters that fully specify the quality of potable water are quite large, an evaluation can be made if one can find some correlation among those numerous available parameters. Studies on aquatic chemistry of India have been made by Kumar and Paul (1991), Baruah et al (1997), Hazarika and Dutta (1999), Singh (2000) and Ravikumar et al. (2006). Water possesses a number of physical and chemical characteristics that helps the molecule to act as best suited medium for the life activities. Majority of the biochemical reactions that occur in the metabolism and growth of the living cells involve water, hence it has been reserved to as a universal solvent. Literature also reveals that nobody worked in the recent past on water quality of Kali River has been carried out. Hence, this paper deals with the quality of Kali river water.

Physico-chemical characteristics of Kali River have been carried out through out the world by a number of workers (Bagde, 1985; Shastri, 2004). But most of these studies are restricted to well known locations or sites and some times repeatedly. No attentions has ever been paid to such ecosystems located in distinct and remote areas which are always part of routine domestic life in developing countries like India, as reported earlier (Ara, 2003). The present investigation is an effort to study Kali River at Karwar.

Material and Methods

The river Kali in Karwar taluka originated from Kusavali village and run about 185 km and mixed into the Arabian Sea near the Karwar taluka. The samples

were collected from the Kali River Karwar (74.18767° N, 14.88362° E).

The study was carried out by systematic collection and analysis of water samples. The method for all parameters were followed vide APHA, (1998), and Trivedi and Goel (1986). The parameters such as air and water temperature, and pH were analysed on site, while other parameters were estimated in laboratory.

Results and Discussion

The values obtained for various physico-chemical parameters observed have been summarized in Table-1.

The air temperature was found minimum and maximum in the month of January and October, respectively. The water temperature is directly influenced by ambient air temperature, hence showed a downward trend from October to February followed by an upward trend during the next months. The value of water temperature varied from a minimum 11.3°C to a maximum of 19.6°C. in the month of January and October, respectively.

Transparency is the penetration capacity of light in water, which is mainly influenced by the particulate impurities present in it (Hegde, 2005). Transparency ranged between 52.6 cm to 76.8 cm during the study period of March to February. Nutrient influx from catchments agricultural field and growth of macrophytes especially during high temperature period are said to reduce transparency (Shastri, 2004).

The turbidity in water is mainly caused by sand, silt, clay, phytoplankton, microorganism and organic material suspended or dissolved in it. The turbidity varied between 14.8 J.T.U, to 20.7 J.T.U, maximum value was found in the month of October and November, may be due to high temperature and more

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disturbances in water and minimum turbidity was found in the month of January, February and March. The value shows a trend as also reported by earlier workers (Bagde, 1985) (Das, 2003) (Sharma, 1998).

The maximum value of 8.3 of pH was noted in the month of October as also reported by Naik UG., et al. The pH showed lower limits during winters which may be attributed to the reduction of photosynthesis, as pointed out by Bangde and Verma.

The maximum value of total solids was found 912.80 mg/l during the month of March which may be due to disturbance by the domestic animals while the minimum value of 492.87 mg/l was noted during the month of December.

The maximum value of free CO₂ was found 9.60mg/l in the month of October and the minimum value of free CO₂ was recorded during February, due to low temperature and low microbial activity, which usually shows an increase with rise in water temperature (Chaturvedi, 1981)

The DO is among the most important parameter of any aquatic systems; in case of such river the main source of DO is phytoplankton and other aquatic plants present in eco-system. It is therefore considered as an index of functioning of biological and physiological process (Trivedi, 1986), (Chaturvedi, 1981). The minimum value of DO was noted 9.66 mg/l during March while the maximum value of DO was 11.75 mg/l in the month of November. The trend of variation was as found as reported for some rivers and reservoirs of India (Trivedi, 1986; Joshi, 1992; Banatwala, 2004)

BOD ranged between 1.20 mg/l to 4.40mg/l. the minimum value of BOD was noted in the month of March and maximum 4.42 mg/l in the month of November.

The minimum value 14.81 mg/l in the month of February and the maximum value of chloride was 21.65 mg/l in the month of October, the higher range coincides with agricultural runoff obtained by the river in the post monsoon and post harvest season, in this part of the country.

Table 1: Monthly variation in some Physico-chemical parameters of Kali River (The values are mean for three observations each)

Parameters	October	November	December	January	February	March
Air temp (°C)	25.3	22.8	19.3	12.7	18.1	20.4
Water Temp (°C)	19.6	17.4	15.8	11.3	13.5	16.2
Transparency (cm)	54.4	59.3	63.6	69.7	76.8	52.6
Turbidity (JTU)	14.4	15.4	18.4	20.2	20.7	19.5
pH	8.3	7.8	8.0	7.8	7.1	8.1
Total Solids (mg/l)	658.31	588.47	583.59	492.87	638.34	912.80
Free Co ₂ (mg/l)	9.60	4.30	2.30	1.00	0.98	8.80
DO (mg/l)	10.69	11.75	10.37	11.31	10.43	9.66
BOD (mg/l)	3.61	4.42	1.78	2.75	1.23	1.20
Chloride (mg/l)	21.65	21.20	19.32	16.30	14.81	14.91

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