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A studies of toxic metals in Sarkhej lake water, Ahmedabad, Gujarat, India

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Abstract

Sarkhej Lake is located in the Ahmedabad of Gujarat. To assess the environmental pollution of the lake, the total concentrations of As, Cd, Pb, Hg, and Mn were determined in the surface water of the lake. however, the mean concentrations of dissolved metals in sarkhej Lake water were 0.81ppm for As, 1.88ppm for Pb, 12.8ppm for Cd, 1.8ppm for Hg, and 0.063ppm for Mn respectevly .different water quality assessment approaches indicated that in this lake, water can be compared with WHO and BIS limits; Finally, conclude that Sarkhej lake Water Quality was better than Manager Lake water .But, water were not suitable for Drinking purpose.

Key-Words: Studies, Sarkhej Lake, Water quality

Introduction

Ahmedabad is unique in the whole of India in matter of environmental neatness and flourishing conditions and it is superior to other cities in the excellence of its monuments. Ahmedabad Urban development Authority (AUDA) carried out a survey of 645 lakes and identified 22 lakes which have been severely degraded. AUDA proposes to undertake works for revival, development of catchments area and beautification of lakes under the present project. Of these, Sarkhej Lake is located at Sarkhej Village, near AMTS Bus station, near National Highway No.8, Ahmedabad its total storage capacity is 67.0 Carore liters. Lake Desilting Area is 4309 m^3 and peripheral development works including landscaping: recreation facilities are such as Amphi theatre, children park and percolation wells to recharge ground water table. AUDA has commenced work on this lake also through own resources. Lakes can be readily contaminated by human activity without any obvious signs Oyewale, (A. O. & Musa, I. 2006), thus they have long attracted scientific and environmental interest. Among the various pollutants, heavy metals are the most Toxic, persistent, and abundant that can accumulate in aquatic habitats and their concentration increases. Through biomagnification (Sin, S. N., Chua, H., Lo, W. & Ng, L. M., 2001; Kishe, M. A. & Machwa, J. F., 2003; Ahmed, F., Bibi, H. M., Monsur, H. M. & Ishiga, H. 2005).

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The most toxic heavy metals Pb, Cd, and As.Cd are carcinogenic; As and Cd are teratogenic, and the health effects of Pb include neurological Impairment and malfunctioning of the central nervous system (Markus, J. & McBratney, A. B. (2001) ; Nadal, M., Schuhmacher, M. & Domingo, J. L. (2004)). Thus, for organisms living in lakes, elevated essential and non-essential heavy metal content may impart a significant impact on health, reproduction, and survival. Contaminants may eventually pass through the food chain to human and result in a wide range of adverse effects. Heavy metals are natural constituents of lake waters, and some of the essential ones are present at low concentrations. However, during the last few decades, rapid expansion of human activity has continuously accelerated the risk of environmental pollution with heavy metals. Distinguishing the anthropogenic inputs from the natural ones is the basis of environmental management. Heavy metals discharging into a lake from both natural and anthropogenic sources are distributed between bed sediments (as sink and source of heavy metals) and aqueous phases. Thus, in evaluating the pollution condition of a water body, both sediments and water should be considered (Lee, S., 2003).

Methodology

Water samples were collected in 1 L new PE bottles. Samples were collected for monthly from January-2009 to December -2009. Heavy metals were analysed and priservation using standard methods given by APHA, 1998(tri acidic methods) and Vogel's 1989. Was determining by Atomic Absorbance spectrophotome (AAS) method: Distilled water was used as control for comparison and their results were

compared with the desirable limit and permissible limit of: WHO, 1984.

Results and Discussion

Dissolved trace element concentrations are generally taken as indicators of the pollution extent in an aquatic environment. The concentration of other analyzed trace metals in the Sarkhej Lake water ranges as follows: As (0.11 -0.81 ppm), Cd (3.21-12.8ppm), Pb (0.01-1.88ppm),Hg (1.0-1.8 ppm), and Mn (0.1-0.63ppm). The mean values of analyzed trace metals in the Sarkhej Lake water are higher than the reported Allowable values for fresh water , Markert, B. (1994) and aquatic life ,Health Canada (2003) (Table 1). In particular Pb and Cd values are high, pointing to anthropogenic loading, probably from munciple waste, garbage suwege dumping discharges and soil runoff *et al.*, S.D Vediya and S. S. Patel (2011). The main purpose of this study was to assess the environmental contamination of SarkhejLake With respect to selected heavy metal concentrations in surface water. On the basis of the Obtained data, the following: Ahmadabad city is situated on the River bank of Sabarmati and in Around Industrial Areas at Gujarat. The Water samples were collected from Different Point of Sarkhej Lake. The higher ranged of Cadmium , Arsenic ,Mervury,Manganes and Lead were above WHO Standards .The Heavy metal Contamination like Cd>Pb>Hg>As and >Mn Were studied comparatively during January- 2009 to December-2009. The results suggested that water was not suitable for Drinking Purpose.

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Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
As	0.51	0.28	0.4	0.14	0.19	0.11	0.47	0.26	0.15	0.2	0.81	0.36
Pb	0.06	0.1	1.22	1.41	0.01	0.06	0.07	0.05	0.01	1.88	0.02	0.06
Cd	12.8	8.9	11.8	5.84	3.98	7.23	4.23	11.4	3.21	7.11	6.74	7.41
Hg	1.3	1.8	1.5	1	1	1.1	1.3	1.6	1.5	1.1	1.8	1.3
Mn	0.63	0.51	0.16	0.12	0.15	0.2	0.28	0.15	0.11	0.15	0.1	0.63

Table 1: Analysis of toxic Metals (ppm) in water of Sarkhej Lake during the year 2009 for comparative study of pollution