

ANALYSIS OF TOXICANT OF FERTILIZER INDUSTRY WASTE EFFLUENT AT BHOPAL, MADHYA PRADESH

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ABSTRACT

The in-plant pollution control measures are very significant particularly in case of Fertilizer industry. The relates to elimination in volume and strength of effluent by incorporation of suitable pollution control measures in the plant itself. The studies on Bio-Physico-Chemical analysis of the Bhopal city were carried out from December 2014 – 2015. It has been concluded that Bhopal Lake is highly eutrophic and biologically ‘dead’ in term of its un ability to provide the aesthetic pleasures of swimming, boating, fishing and the effluent of fertilizer industrial due to luxuriant growth of micro and macro flora and fauna.

KEYWORDS: Water-quality, Eutrophic, Physico-Chemical, Organic Pollution Fertilizers

Bhopal is the capital town of the M.P. Its geographical area is 284.9 Km² (Census report, 1991) and its altitude above sea is 505 m. The city lies between Latitude 23^o 34 inches N and longitude 77^o 10 inches to 77^o 10 inches to E.

The Bhopal Lake is facing the problem of organic pollution due to the major discharge of effluent of fertilizer industries, raw sewage, and detergents etc. Lake emanates foul smell in summer season due to effluent accumulation there by causing health hazards to the surrounding human population. Hence the present work was undertaken to evaluate the status of organic pollution and water quality by Bio-Physico-Chemical analysis. Some not able work on this aspect has been done by Dhamija and Jain (1994), Kumar (1995), Rao et al (1996), Khare (1998, 1999) and Kumar and Singh (1998).

MATERIALS AND METHODS

Water sample were collected twice in a month of years 2014-2015 . Trivedi and goel (1986) and Biological parameters (Michael, 1973 and Adoni, 1985). Plankton samples were collected by standard methods from predetermined sampling sites and preserved in 2-5% formalic and few drops of glycerin. Counting and identification of plankton were done as per Apha (1985), Adoni (1985) and Michael (1973).

RESULTS AND DISCUSSION

The result of plankton population is shown in (Table 1 and 2). The temperature was higher in month of April 2015 and lower in December 2014 and medium in February 2015. The range being between 18.5-34 C. it has an indirect effecting. The toxicity, intensifying deoxygenating and finally increasing the biomagnifications that is why, the dissolved oxygen depletion and plankton community intensity their span in month of April 2015. Eutrophic waters are characterized by blooms of Cyno-bacteria (Kumar, 1995) this is true in case of Bhopal lake. The nature and

Health of the aquatic communities is an expression of the quality of water (APHA, 1985). Water

pollution manifest through changes such as Physical, Chemical and Biological.

Lake water was alkaline through out the study period (7.1-11.1). The alkalinity was lower in the month of December (2014), higher in April (2015). The minimum and the maximum values of the total dissolved solids were 460 to 610 in Tale 3.

Table 1: Phytoplankton population observed in Bhopal Lake water during (2014-2015).

Class-Chlorophyceae	Class- Cyanophyceae
1. Eudorina sp.	1. Microcystis Aeruginosa kunt=
2. Chlorella	2. Micro cystiscyanea
3. P. duplex megan	3. Anabaena circinalis
4. P. simplex meger	4. Rivularia gigantean Schmilde
5. Spirogyra sp.	5. Nostac sp.
6. Mougeotia transeque Collins	
7. Mougeotia gelatinosa wittrock	Class- Euglenophyceae
8. Closterium sp.	1. Phacus platalac Dreg.
9. Casmarium sp.	

Table 2: List of zooplankton population observed in Bhopal Lake, Bhopal (M.P.)

Phylum : Protozoa	Phylum : Arthropoda
1. Amoeba	1. Basmanyia sp.
2. Paramecium Aurelia	2. Daphnia similes
3. Vorticella campanula	3. Moina sp.
4. Euglena sp.	4. Monostyla sp.
Phylum Rotifera	5. Nauplius larvae
1. Asplanchna sp.	6. Cyclops viridis
2. Brachionus falcatum	
3. Keratella tropica	
4. Lecane . sp	

The algal population has a direct relationship with the total solids (Rao et. al,1996; Khare, 1999), which was also reflected in the Bhopal Lake investigation. The all date of Table-1,2,3 clearly

indicated that the water is facility contaminated by sewage and fertilizer high alkaline, enriched with nutrients favors the microbial growth and render it unsuitable for portable purpose. The sudden depletion of oxygen is the main cause for heavy mortality of organisms (April). Overstocking of organisms may also be described to the large scale destruction during anoxic

condition of Lake water in such a situation even a small fluctuation in dissolved oxygen will produce adverse effect. Thus, It has been concluded that the Bhopal Lake is highly eutrophic and biologically dead/ because the total production of biomass is many times greater in eutrophic lake than oligotrophic tank.

Table 3: Physico-Chemical characteristics of Bhopal water of Bhopal (M.P.) From December 2014-2015

Parameters	Dec. (2014)	Jan. (2015)	Feb. (2015)	Mar. (2015)	Apr. (2015)
Temperature 0 ⁰ c	18.5	17.6	21.2	25.9	34
Transparency In cm	22.4	17.2	19.6	24.0	27.1
pH	7.1	7.8	8.8	8.4	11.1
Total dissolved solid (ppm)	580	568	490	460	610
DO (ppm)	12.8	14.6	11.8	8.9	6.3
Free Co2 in (ppm)	2.95	6.2	7.05	5.6	4.3
Carbonate (ppm)	78.7	110.4	60.4	88.2	100.6
Ca in ppm	29.1	33.3	34.4	37.1	40.6
Mg in ppm	12.4	12.0	12.4	14.7	21.6
Phosphate in ppm	0.11	0.11	0.33	0.20	0.22
Nitrate inppm	1.37	1.16	1.01	1.10	0.84
Chloride in ppm					66.7
Potassium in ppm	91.8	97.8	99.9	93.0	102.4

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