



ASSESSMENT OF WATER QUALITY IN LAKE WATER SAMPLE OF RANKALA AT KOLHAPUR

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ABSTRACT

Water is a source of life. But pollution of water is the biggest threat in today's world. Kolhapur city of Maharashtra state is known for its beautiful lakes. . As most of these water bodies contain, domestic sewage, industrial waste, agricultural waste thus deteriorating water quality. The increasing trend in concentration of heavy metals in the environment has created lot of awareness about environmental pollution. These heavy metals have a marked effect on the aquatic flora and fauna which through bio magnification enter the food chain thereby affecting the human being. Hence this study is carried out to assess the quality of water in lake water samples. As the quality of water greatly affect the all forms of life , this attempt has made to asses and monitor the quality by studying physico-chemical properties of water. The lake water samples were collected from Rankala at Kolhapur and analysed every month throughout the year. So, we have studied levels of nitrate in lake water sample from Rankala , Kolhapur . Annual average of nitrate content was 0.95mg/L.

Key words: Lake water sample, Pollutants, Nitrate, Kolhapur, Maharashtra

I. INTRODUCTION

Water is an essential part of our life on which depends life cycle and existence of entire bio-diversity. Human being can not make or generate either of these basic elements of life in a form in which those are needed. As such the human beings have no right to destroy, waste with any of these resources. Wherever and in whatever form those may be found, it is our basic responsibility to conserve such natural resources. Water quality has become a serious issue due to increasing industrialization, urbanization and man-made problems. The constituents present in the water systems depends on the nature where the water body is situated and the discharge quality from various sources in that water body. In Kolhapur city Rankala has the famous lakes. Some lakes are in the city, some are near the industrial area. Rankala lakes are also used for Ganesh idol immersion during Ganesh festival. Boating is the biggest activity carried out at some lakes. Oil seepage is the biggest problem at some lake. Most of the lakes situated right next to the road. Surface drainage from roads is let into the lakes. The lakes have a complex and fragile ecosystem, as they do not have self-cleaning ability and therefore readily accumulate pollutants. It has been reported that sewage effluents

of municipal origin contain appreciable amount of major essential plant nutrients and therefore the fertility level of the soil are improved (Sharma et al, 2004). The quality of the water sample varies with the type of the area of lake location. Location of lake decides the variety of waste material and sewages added to the lake. Various pollutants entering the ecosystem may be bio-degradable and non-biodegradable through drains and increases the level of BOD and COD very high which depleting the dissolved oxygen in water hence regular monitoring of water quality is the mandatory in developing countries like India, because of urbanization and industrial developments are moving towards coastal area. The inshore areas usually get disturbed with more critical water pollution problems than offshore^{1, 2} As the quality of water disturbed because of various sources, a systematic study was carried out to assess the quality of water from 12 different lakes by monitoring Physico - chemical parameters of lake water samples for the period of one year for every month. and the pollution level of each water samples are compared with guidelines prescribed by Indian Standard Institution. . The run off waters coming from intensive agricultural activity (involving the use of fertilizers) also significantly contribute to the higher nitrate content in lake water samples.

Objective of the study: To measure and monitor the existing condition of water body by assessing the monthly variations of physico-chemical parameters.

II. METHODS AND MATERIALS

Nitrate ion reacts with Brucine in strong sulphuric acid solution to form yellow colour, which is measured spectrophotometrically.

Reagents –

- a) Standard Nitrate Solution-Dissolve 72.2 mg potassium nitrate (KNO_3) in distilled water and dilute up to 1000 ml in a volumetric flask. This solution contains 10mg/lit of nitrate.
- b) Brucine- Sulphanic acid solution – Dissolve 1g brucinesulphate and 100mg sulphalinic acid in 70 ml hot distilled water. Add 3ml. Concentrated HCL, cool and dilute to 100ml with distilled water.
- C) Sodium arsenate solution-Dissolve 1.183 g sodium arsenate (Na_2So_2) in 100 ml distilled water.

III. RESULT

In the present study, nitrate values estimated at various sites varied from as low in pond water sample was 0.19 mg/lit up to 10. 70 mg/lit. (Table No-87) , concentration of nitrate was highest in summer i.e 1.35 mg/lit . , followed in rainy season i.e . 0.14 mg /lit .(Table No-88) . Leaching of fertilizers in winter used for agricultural purpose for higher nitrate concentration in water. The observed maximum values of nitrate estimated during winter are in agreement also with those by Prasad and Saxena (1980), whose study indicates that due to floods , nitrate contributing algae from rocks carried in waters , which minimize fixation of nitrates during rainy season . Minimum concentration of nitrate during rainy season is also due to increased volume of water and flooding water dilute nitrate concentration with

increasing downstream distance is observed. This is because of its consumption by densely growing water hyacinth, covering the whole portion of lake water (pond water).

IV. DISCUSSION

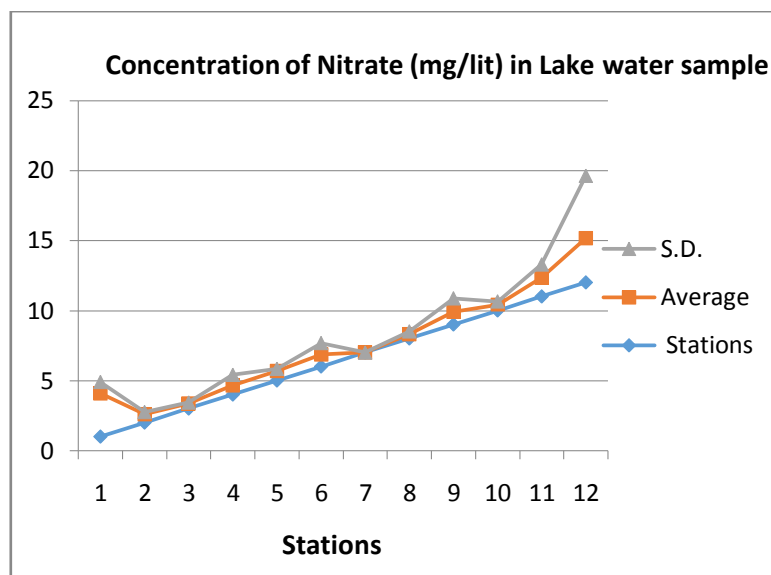
The annual average nitrate level of lake water sample at Rankala in kolhapur city was 1.03 mg/lit. Sources of nitrate include leaches from agricultural waste, industrial waste, domestic garbage, bath , washings in lake water samples , Boating etc . Being a major plant nutrients, nitrate is rapidly used by plants and denitrifying microbes. Therefore level of nitrate fluctuates depending on the growth of biota in waste water bodies. In the case of sampling stations 2, 3, 4 there was a good growth of algae, resulting in to utilization of nitrates and therefore low level of nitrate are observed. At site No – 6 & 19 , there was high level of nitrate. It is a common observation that wherever there is a large plant biomass , there is a low level of nitrate, it being consumed as a major plant nutrient for growth. Thus , low level of nitrates coincides with high level of aquatic plants.

Fig No.1 Level of Total Nitrate mg/lit in Rankala Lake Water Sample

Station	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
1	1.30	0.56	0.28	0.41	0.72	0.00	0.00	0.34	0.92	0.47	0.68	0.42
2	2.91	0.48	0.32	0.70	0.81	0.30	0.00	0.17	0.17	0.34	2.90	0.95
3	2.92	0.60	0.19	0.31	0.64	1.07	0.00	0.22	0.22	0.31	0.91	0.58
4	3.65	0.75	0.35	1.04	0.82	1.62	0.00	0.21	0.24	0.42	1.85	0.68
5	3.50	0.66	0.49	0.38	0.91	1.63	0.00	0.18	0.19	0.55	1.56	10.58
6	3.40	0.97	0.44	0.63	0.81	0.05	0.00	0.50	3.41	0.70	3.41	0.91
7	2.85	0.55	0.32	0.26	0.54	0.61	0.00	0.70	0.77	0.19	1.19	10.70
8	3.20	0.67	0.37	2.90	0.71	0.00	0.00	0.61	1.20	0.25	1.20	0.68
9	2.51	0.37	0.41	0.54	0.56	2.31	0.00	0.18	1.25	0.26.	0.31	10.34
10	3.04	0.44	0.36	0.15	0.51	1.84	0.00	0.31	0.72	0.73	0.75	0.77
11	2.81	0.47	0.34	0.25	0.82	0.00	0.00	0.29	1.77	0.78	0.71	0.74
12	4.82	0.54	0.17	0.30	0.47	0.71	0.00	0.10	0.12	0.17	0.77	0.79

Fig No.1 Level of Total Nitrate mg/lit in Pond Water Sample

Stations	Average	S.D.
1	3.08	0.82
2	0.59	0.16
3	0.34	0.09
4	0.66	0.75
5	0.69	0.15
6	0.85	0.83
7	0.00	0.00
8	0.32	0.19
9	0.92	0.95
10	0.43	0.22
11	1.35	0.94
12	3.18	4.44



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