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STUDY OF PHOSPHATE PRESENT IN THE UNDERGROUND WATER OF NIPANI TOWN

AMIT VARALE and YASHODHARA VARALE*

Department of Environmental Study, Dr. Ambedkar College of Commerce and Economics,
WADALA (E) MUMBAI – 400031 (M.S.) INDIA

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ABSTRACT

The ground water samples were collected from twelve tube wells from Nipani town and analysed every month throughout the year. So, we have studied levels of phosphate in underground water near the industries and sewage disposal sites. Phosphate content was 2.3 mg/L.

Key words: Underground water, Pollutants, Phosphate.

INTRODUCTION

Due to continuous demand for water is growing rapidly as population and industrial activities are expanding and irrigated agriculture continues to increase. Rapid industrialization industrial effluent are discharged in water these are dangerous to human health as well as biotic habitats.

In the present study, the level of phosphate were studied in the vicinity of sugar factory located at Nipani. The underground water samples were collected from twelve tube wells in the glass bottles by following standard procedure[1]. Samples were taken from twelve tube wells which are located at 1. Bhim Nagar 2. Savant Colony 3. Ayodhya Nagar 4. Bhopale Galli 5. Ambalzari Nala 6. Azad Galli 7. Burud Galli 8. Pratibha Nagar 9. Ashray Nagar 10. Pragati Nagar 11. Shivaji Nagar 12. Mestri Nagar. The samples were collected every month throughout the every year and analysed in labouratory for the levels of phosphates[2,3].

EXPERIMENTAL

Methodology for determination of phosphate

There are several methods available for the determination of orthophosphate viz. vanado – molybdate method, molybdenum blue method and ascorbic acid method[4,5]. Out of these, vandomolybdate method was choosen in the present work for the estimation phosphate in water samples.

This method is considered to be slightly less sensitive than the molybdenum blue method but it has been particularly useful for phosphrous determination carried out by means of schoiger Oxygen flask method[6,7]. The phosphor -vanado-molybdate complex formed between the phosphate, ammonium vanadate and ammonium molybdate is bright yellow in colour and is its absorbance is measured at 465 nm.

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*Author for correspondence; E-mail: yashodharavarale@gmail.com

Reagents

a) Ammonium vanadate solution.

b) Ammonium molybdate solution.

c) Standard phosphate solution.

Procedure

A 10 mL aliquot (i.e. 4 mg. Phosphate) of this solution was placed in a 100 mL graduate flask in the presence of 50 mL water and 10 mL of ammonium molybdate solution and diluted to mark. Like this, a series of standards were prepared from potassium dihydrogen phosphate standard solutions covering the range 0-20 mg phosphrous per 100 mL and containing the same concentration of acid, ammonium molybdate and ammonium vanadate as earlier absorbance of this solution was determined at 465 nm using 1 cm cell, against a blank preapered in the same manner[8,9].

RESULTS AND DISCUSSION

Phosphates occur in natural wastes and waste water as Orthophosphates, condensed phosphate and organically bound phosphates, in solution, particulate matter and in the bodies of aquatic of micro-organism. Orthophosphates are applied to agricultural or residential cultivated land as fertilizers and transported in to surface water during stormy runoff. Organic phosphate is formed. Primarily by biological processes from orthophosphates. They are contributed to sewage by loody wastes and food residues.

The quantities of phosphates varied throughout the investigation at all stations of surface waters[10].

This might due to constant contamination of domestic sewage, cloth washing, bathing, decay of aquatic organisms and and mankind activities similar collaboration between amount of phosphate and human activities was observed by Hachinson.

From Table, concentration of phosphate in industrial effluent ranged from 1.56 mg/L. In Jaunary to 3.77 mg/L in December and in tubewell water samples phosphate ranged from 1.57 mg/L in January to 3.78 mg/L. in December (Tables 1 and 2). Winter season showed higher phosphate concentration in industrial effluent, pond water samples and tubewell water samples are 3.03 mg/L, 2.05 mg/L and 1.89 mg/L followed in summer 1.39 mg/L, 1.28 mg/L and 1.20 mg/L and a reduced in rainy season i.e.0.37 mg/L, 0.36 mg/L and 0.35 mg/L. (Tables 1 and 2).

Table 1: Phoshphate (mg/L) in pond water samples during the monitoring period (January 1999 to December 1999)

Stations	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	2.29	5.99	2.22	1.93	1.72	0.02	0.97	0.55	0.56	0.57	3.77	3.04
2	2.15	4.02	1.33	1.26	1.07	0.05	0.48	0.08	0.1	0.11	5.41	3.78
3	2.54	5.21	1.65	1.47	1.23	0.02	0.14	0.24	0.26	0.27	3.83	3.19
4	3.26	5.55	2.18	1.61	2.12	0	0.48	0.19	0.21	0.22	3.69	3.48
5	2.82	4.81	2.04	1.85	2.15	0.33	0.37	0.13	0.15	0.16	3.15	2.99
6	2.16	4.32	1.46	1.33	1.18	0.22	0.61	0.79	0.8	0.18	0.98	1.58

Cont…

Stations	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
7	1.75	4.93	1.43	1.64	1.26	0	0.07	0.83	0.84	0.85	3.92	2.84
8	1.57	1.04	0.98	1.23	1.18	0	0	0.09	0.09	0.11	3.9	2.74
9	1.58	4.63	1.21	1.33	12.25	0.71	0.06	0.04	0.05	0.06	3.46	2.52
10	1.6	4.71	1.16	1.32	1.26	0	0.37	0.29	0.31	0.32	1.15	1.38
11	2.46	3.47	2.72	1.26	1.58	0.01	0.58	0.21	0.21	0.22	1.32	1.36
12	2.35	4.43	1.51	1.36	1.4	0	0.26	0.21	0.21	0.22	1.51	1.63

Table 2: Phosphate (mg/L) in pond water samples during the monitoring period (January 1999 to December 1999)

Stations	Average	S.D
1	1.97	1.69
2	1.65	1.82
3	1.67	1.69
4	1.92	1.79
5	1.75	1.53
6	1.35	1.06
7	1.7	1.5
8	1.08	1.21
9	2.33	3.45
10	1.16	1.24
11	1.28	1.12
12	1.26	1.26

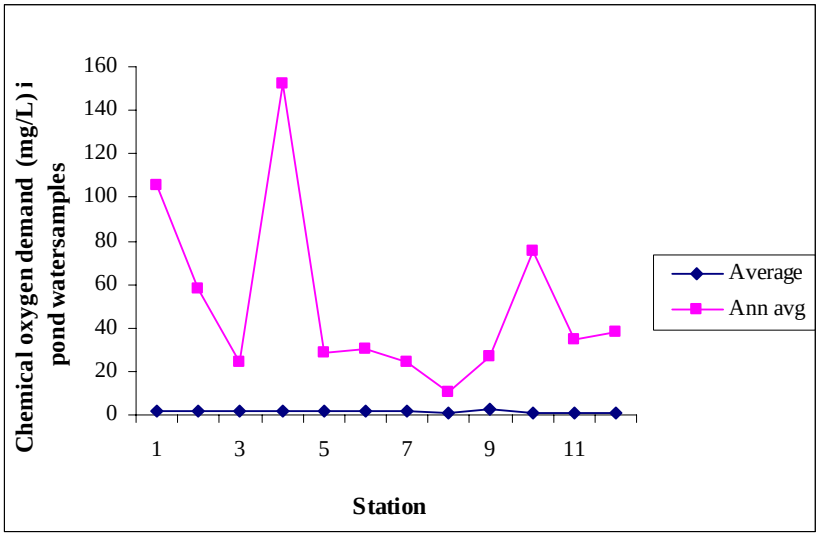

Fig. 1: Phosphate (mg/L) in pond water samples during Jun. 1999 to Dec. 1999

Stations	Average	Ann. Avg.
1	1.97	105.18
2	1.65	57.73
3	1.67	24.18
4	1.92	152.31
5	1.75	28.69
6	1.35	30.21
7	1.7	24.41
8	1.08	10.53
9	2.33	26.48
10	1.16	75.5
11	1.28	34.56
12	1.26	38.24

Average seasonal level of phosphate (mg/L) in Tube-Well water samples at various sampling stations				**Ann. Avg.**
Stations	**Summer**	**Rainy**	**Winter**	
1	1.06	0.12	2.2	1.14
2	0.6	0.54	1.6	1.14
3	0.8	0.35	1.07	1.14
4	1.2	0.38	1.37	1.14
5	1.15	0.5	1.4	1.14
6	1.4	0.48	1.78	1.14
7	1.35	0.31	1.87	1.14
8	1.4	0.14	2.4	1.14
9	1.45	0.28	2.34	1.14
10	1.6	0.62	1.87	1.14
11	1.4	0.37	1.9	1.14
12	1.08	0.22	2.3	1.14
Seasonal average statistics				
Average	1.21	0.36	1.84	
S.D.	0.29	0.16	0.42	

The present study has shown higher phosphate level regardless of seasonal fluctuations, indicating sucession of surface water i.e. pond water from Oligotrophic to eutrophic state Water at sampling site 4,5,6,7 showed higher average value of phosphate to city sewage and domestic waste mixing in to the surface waters. A contribution, most likely due to industrial effluents and leaching from the agricultural land, is also a strong possibility. A similar profile emerged regardless of seasons. According to Edmondson, therefore, sewage effluents have been regarded on good source of phosphates.

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