Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2013, 5(5):233-235

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Assessment of calcium content in industrial effluent of rural parts of Nipani town and its impact on human health

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ABSTRACT

Normally, a flow of surface water draining through humid area contains more calcium than any other ion. Calcium is the most common cation in fresh water at 20^{0}c, 5.6 mg/lit dissolve. Causing pH 9.9 to 10.0. As calcium ion is relatively large, it can be hydrated & forms complexes with inorganic ions. To calculate the concentration of calcium in the present study the discharge of industrial effluent (water sample) in the vicinity of sugar factory were collected and analyzed every month throughout the year. So, we have studied the calcium present in industrial effluent (water sample). Calcium was extremely low was 3.21 mg/lit.

Key words: Industrial Effluents, Pollutants, calcium.

INTRODUCTION

It is the most abundant alkaline earth element in the earth crust derived from natural sources like carbonate, phosphates, sulphate, fluorides and silicates. Green Wald (19ml) showed that about 10% Ca ++ occurs in bicarbonate form [1,2] . Normally , a flow of surface water draining through humid area contains more calcium than any other ion (Hem 1970) calcium is the most common cation in fresh water , at 20^{o}C , 5.6 mg/lit dissolve , causing pH 9.9 to 10.0 . As Calcium ion is relatively large , it can be hydrated and forms complexes with inorganic ions . (Mattness and Harvey , 1982).

In the present study, the levels of CALCIUM were studied in the vicinity of Halsiddhanath sugar factory located at Nipani. The industrial effluent (water samples) were taken in twelve glass bottles by following standard procedure[3-5]. Samples were taken from twelve bottles from industrial effluents which are located at 1. Bhim Nagar, 2. Nagoba lane, 3.Kharade lane, 4. Namar mal, 5. Shivaji Nagar, 6. Andolan Nagar, 7. Kmgar Chowk, 8.Ambale polt, 9. Mestri Nagar, 10. Ramling Temple, 11. Mestri Nagar, 12. Bhise lane. The samples were collected every month throughout the every year and analyzed in laboratory for the levels of CALCIUM..

EXPERIMENTAL SECTION

Methodology for determination of calcium

Volumetric determination of calcium was carried out by EDTA method . In this method , EDTA combines first with calcium and when pH is made sufficiently alkaline , magnesium is precipitated as hydroxide and the indicator muroxide combine colour turns to violet at pH 12 to13.

Reagents-

a) Buffer solution-
b) EDTA solution (0.01M)
c) Erichrome black-T

Procedure-

A 50 ml aliquot of water sample was taken in a clonical flask. To this , 1ml of buffer solution and 2.5 drops of Na_2S solution were added about 100-200mg of erichrome black-T indicator was added to the same , when the solution turned wine-red . The mixture was titrated against standard EDTA solution. At the end point colour changed from wine-red to blue . The calcium was calculated using the following formula.

The concentration of calcium ions (Ca^{+2}) is determined using the following formula.

Calcium (mg/lit) = ml of EDTA X 400.08 / ml of sample

RESULTS

Concentration of calcium in present study ranged from minimal 3.21 mg/lit. to maximal 48.50 mg/lit. in industrial effluent , minimal 5.65 mg/lit to 68.74 mg/lit . in pond water and minimal 2.37 mg/lit to maximal 62.56 mg/lit in tube well water . (Table N0 130 , 132 , 134) Its average value was higher in winter 32.22 mg/lit , 29.72 mg/lit and 23.42 mg/ lit .[6-8], followed in summer 25.12 mg/lit , 26.08 mg/lit and 25.58 mg/lit , in rainy season 19.44 mg/lit , 19.90 mg/lit and 18.11 mg/lit in industrial effluent , pond water and tube well water (Table N0: 131,133,135).

DISCUSSION

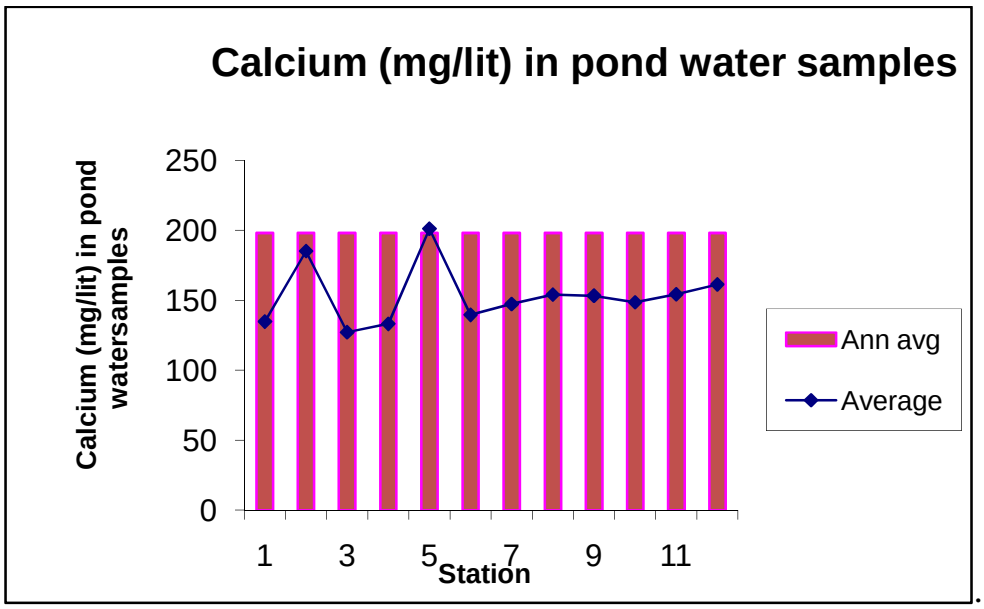
A similar pattern was observed by Varghese et . al . (1992). Higher concentration of calcium was found at Ambalzari Nala due to disposal of industrial effluents (Fig .No. 29) . Their station wise , month wise and season wise profiles are depicted in Fig . 50. It has been found that disposal of sewage and industrial wastes are the major sources contributing to calcium content in water[9-11] .

Table 1: Calcium (mg/lit) of industrial effluent during the monitoring period

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	20.84	16.34	20.04	23.26	23.69	24.14	20.08	18.44	16.04	17.10	21.64	21.20
2	23.25	32.87	19.25	24.81	24.80	16.80	15.20	24.05	15.35	16.25	25.05	23.65
3	32.80	27.25	27.25	29.86	34.40	20.05	14.45	28.07	14.30	15.35	28.07	30.47
4	28.07	46.40	32.06	29.75	23.20	39.25	11.24	15.20	20.30	16.25	62.50	45.29
5	59.32	17.64	56.11	43.70	6.42	66.54	11.21	16.04	13.21	12.15	52.10	55.71
6	37.60	4.38	24.05	32.80	5.65	82.50	24.82	30.07	17.18	19.25	35.25	36.48
7	23.20	19.30	20.80	23.27	4.85	24.55	12.81	28.47	25.17	20.09	44.09	33.67
8	20.04	18.75	20.04	18.45	3.25	25.65	9.61	17.62	20.35	34.20	27.20	23.69
9	20.05	18.64	19.24	20.05	6.42	30.70	19.20	19.25	30.19	41.04	17.64	18.84
10	18.44	17.64	17.65	20.81	4.01	25.35	17.64	16.04	21.03	20.01	21.62	20.04
11	18.46	16.93	20.05	17.65	3.21	23.20	14.45	20.85	14.11	14.12	18.45	18.45
12	19.24	20.84	40.08	40.29	34.48	23.16	21.64	78.50	15.60	13.20	26.42	22.40

Table 2:Calcium (mg/L) in industrial effluent during the monitoring period

Stations	Average	S.D
1	20.23	2.79
2	21.78	5.30
3	25.19	7.23
4	30.79	15.21
5	34.18	23.08
6	29.17	20.17
7	23.36	9.79
8	19.90	7.96
9	21.77	8.63
10	18.36	5.14
11	16.66	5.06
12	29.65	17.72



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