



Research Article

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Study of total alkalinity present in the industrial effluent (water sample) of Nipani Town

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ABSTRACT

The Industrial effluent (water sample) were collected from sugar factory and analyzed every month throughout the year. So, we have studied the total alkalinity in industrial effluents. Total alkalinity was extremely low was 49.5 mg/lit.

Key words: Industrial Effluents, Pollutants Alkalinity.

INTRODUCTION

Tremendous increase in Industrialization the discharge of industrial wastes i.e. effluent from sugar industry in surface water in the vicinity of sugar factory created serious problems of water pollution. In developing countries like India, this problem has become acute day by day[1-3].

In the present study, the levels of Total Alkalinity were studied in the vicinity of Halsiddhanath sugar factory located at Nipani. The underground water samples were taken from twelve underground tube wells in the glass bottles by following standard procedure. Samples were taken from twelve underground tube wells 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 Total Alkalinity[4-6].

EXPERIMENTAL SECTION

DETERMINATION OF ALKALINITY

Larsel et al (1955) and Thomas et. Al (1960) has suggested different methods for the determination of alkalinity in natural waters in terms of equivalent of CaCO₃. Titrimetric method was therefore followed in the present work. Hydroxyl ions present in the samples as a result of dissociation or hydrolysis are determined by titration against hydrochloric acid using phenolphthalein indicator and hence, referred to as phenolphthalein alkalinity. The yellow color changed to pink with methyl orange indicator is called as methyl orange alkalinity. The total of both readings gives total alkalinity present in the water samples[7-8].

REAGENTS –

- a) Hydrochloric acid (0.1N)
- b) Methyl orange indicator
- c) Phenolphthalein indicator
- d) Sodium carbonate solution (0.1N)- Dissolve 5.3 g of Na₂CO₃ (previously dried at 25⁰C for about 4 hours) in distilled water and dilute to 1 lit.

PROCEDURE –

To 100 ml of water sample, two drops of phenolphthalein indicator were added, the solution remains colourless or turns pink depending upon the phenolphthalein alkalinity. If the solution turned pink after the addition of phenolphthalein, the mixture was titrated against 0.1N HCl until end point when colour disappeared. This is termed as phenolphthalein alkalinity (PA).

After that, 2.5 drops of methyl orange were added in the same mixture and titration was carried further until yellow color changed to pink at the end point, which corresponds to total alkalinity (TA). Formula used for the calculations of total alkalinity is

TA as CaCO₃ (mg/lit) = BX Normality of HCl X 1000 X 50/ 50 ml of sample

PA as CaCO₃ (mg/lit) = AX Normality of HCl X 1000 X 50 / 50 ml of sample

Where,

A = ml of HCl used with phenolphthalein.

B = ml of HCl used with phenolphthalein and methyl orange.

PA = phenolphthalein alkalinity

TA = Total alkalinity.

RESULTS

Total alkalinity value varied from as low as in industrial effluent is 49.5 mg/lit. (Table no- 1) Total alkalinity showed enhanced value in winter 169.5 mg/lit. Followed in summer 164.53 mg/lit and in rainy season 159.6 mg/lit. In industrial effluent. Highest total alkalinity value observed during winter may be due to dissolution of carbon dioxide present in soil zone , forming carbonic acid , in turn facilitating reactions between the weathered rock and acidic water , thereby incorporating more and more leached ions in to the solution , giving rise to alkaline waters[9-11]. Persistently high total alkalinity during summer is due to concentration of alkaline ingredients in water as a result of evaporation, which slightly increases in rainy season due to facilitated weathered rocks inspite of dilution with rain water. (Goel et al 1980).

DISCUSSION

Site wise highest total alkalinity was observed at Ramling is near by the point of origin of sugar factory.(Fig No-2). In the absence of pollution at the point of emergence is thought to be due to interaction between the rocks and water sampling at sites alkalinity 3,4,20,26 & 27 showed highest value of alkalinity as compared to other site due to discharge of city sewage & domestic waste is mixing in to ponds at budhyal sampling sites . 7 .(Andolan Nagar) showed a marginally higher values of alkalinity due to passage of surface water through the rock area. Higher value of alkalinity at (Ambalzari Nala) was observed mainly because of picking point of alkaline waste from sugar factory[12-13].

Table 1: Total Alkalinity (mg/lit) of industrial effluent during the monitoring period.

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	175.65	136.56	119.49	116.64	113.80	108.11	130.87	153.63	165.92	172.80	110.50	114.20
2	158.63	108.11	223.29	409.68	308.60	112.05	115.80	165.90	221.46	168.80	112.70	118.30
3	165.55	106.40	121.60	138.50	145.40	132.30	136.20	118.80	113.40	118.40	113.60	116.50
4	170.56	108.20	125.80	143.20	155.60	128.40	148.30	111.30	118.60	121.60	129.40	138.20
5	128.30	120.40	124.30	938.60	156.40	138.20	144.40	108.50	119.20	136.80	138.20	162.30
6	151.50	155.40	130.20	133.50	158.20	148.30	154.40	105.60	115.20	138.40	132.40	152.80
7	220.50	210.30	85.50	128.60	162.50	152.40	152.30	104.30	121.50	146.30	135.30	149.50
8	230.60	165.40	96.30	156.50	186.40	168.50	163.40	102.50	142.20	156.20	140.20	142.30
9	216.40	166.30	98.50	145.30	177.30	185.40	167.50	108.70	154.30	125.30	142.30	153.20
10	196.30	120.80	49.50	175.60	176.40	168.50	176.40	112.20	164.40	129.40	147.50	167.20
11	178.50	88.40	51.80	185.50	225.20	188.40	178.20	113.60	174.50	134.30	155.60	178.40
12	155.60	96.50	68.20	188.40	230.50	190.20	170.30	118.40	187.40	145.20	176.20	210.60

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

Stations	Average	S.D
1	134.85	25.56
2	185.28	93.21
3	127.22	16.89
4	133.26	18.57
5	201.30	232.70
6	139.66	16.89
7	147.42	38.66
8	154.21	35.43
9	153.38	32.92
10	148.68	40.26
11	154.37	48.82
12	161.46	47.45

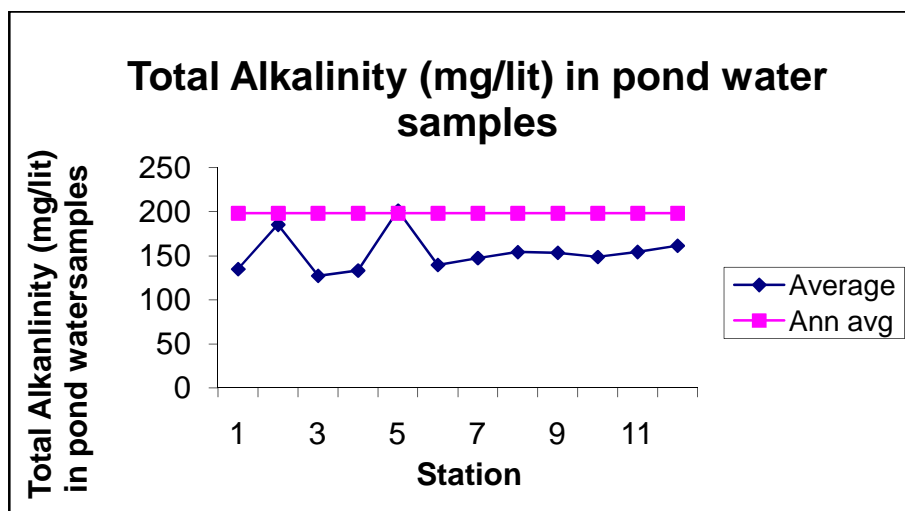


Fig. 1: Total Alkalinity (mg/lit) in industrial effluent

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