International Journal of Applied and Pure Science and Agriculture
ISSN Online - 2394-5532 Impact Factor : 4.446 by SJIF ISSN Print - 2394-823X

STUDY OF CHEMICAL OXYGEN DEMAND PRESENT IN TUBE-WELL WATER SAMPLE OF NIPANI TOWN AND ITS IMPACT ON HUMAN HEALTH

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Abstract
The water samples were taken from twelve tube-wells from Nipani town and analysed every month throughout the year. We have studied levels of chemical oxygen demand (COD) in tube –well water sample. COD content was found higher than the desirable limit of COD (150) mg/L.
Key words: Tube-well water, Pollutants, Chemical oxygen demand (COD).

I. INTRODUCTION

Now a day, due to rapidly increase in population growth & misuses of water by humans has adversely affected on environment as well as human health. This affects lack concern about growing water pollution in the country1, 2, 3. Therefore, assessment of water quality is an important mission and it can be carried out by using various physicochemical and biological methods as a first step in water quality management.

In the present study, the level of COD was studied in the tube-well water sample. The tube-well water samples were taken in the glass bottles by following standard procedure. Samples were taken from twelve tube-wells which are located at 1. Yamgarni 2. Janata housing colony 3. Jamdar Plot 4. Bagwan Galli 5. Kumbhar Galli 6. Burud Galli 7. Azad Galli 8. Ambale Plot 9. Mangalwar Peth 10. Ambalzari Nala 11. Nagoba Galli 12. Ayodhya Nagar. The samples were collected every month throughout the year and analysed in laboratory for the levels of COD.

II. METHODOLOGY FOR DETERMINATION OF CHEMICAL OXYGEN DEMAND

Trivedi and Goel Suggested, chemical oxygen demand (COD) is the measure of oxygen consumed during oxidation of the oxidisable of the organic matter by a strong oxidising agent potassium dichromate solution and concentrated sulphuric acid in presence of mercuric sulphate to neutralize the effect of chlorides and silver sulphate. The (catalyst) the excess of potassium dichromate is titrated against ferrous ammonium sulphate using feroin as an indicator. The amount of potassium dichromate is proportional to the oxidisable organic matter present in the sample.

III. REAGENTS

a. Potassium dichromate solution(0.25N) : Dissolve 12.25 g of dried A.R.grade $K_2Cr_2O_7$ in distilled water to make 1 litre of solution.
b. Ferrous ammonium sulphate (0.1N) : Dissolve 39.39 g of ferrous ammonium sulphate Fe(NH4)2 $(SO_4)_2.6H_2O$ in distilled water . Add 20 ml of concentrated H_2SO_4 to it. Cool and make the volume to 1 litre.
c. Ferroin Indicator : Dissolve 1.485 g of 1.10 phenolphthalein and 0.095 g of ferrous sulphate in distilled water to make 100 ml of solution.

Volume 03, Issue 10, [October- 2017] e-ISSN: 2394-5532, p-ISSN: 2394-823X

IV. PROCEDURE

An aliquot of 20 ml water sample was taken in 250ml of COD flask , 10 ml of 0.25 N $K_2Cr_2O_7$ Solution along with a pinch of silver sulphate and mercuric sulphate were added to it. An aliquot of 30 ml concentrated sulphuric acid was also added to the mixture. This solution was refluxed for 2 hours and then cooled to room temperature. The volume was made to 140 ml. From this , 25 ml aliquot was used for titration , using 2.3 drops of ferroin as an indicator The solution was titrated against 0.1 N ferrous ammonium sulphate until it turned reddish brown from bluish green COD of the sample was estimated using the formula

$$\text{COD (mg/lit)} = \frac{\text{ml of FAS X8X1000XN}}{\text{Ml of sample titrated}}$$

Where FAS = Ferrous ammonium sulphate

N = Normality of FAS

V. RESULTS AND DISCUSSION

The average concentration of COD is found higher than the desirable limit of COD (150 mg/L) i.e. 6.65 mg/L to 172.04 mg/L. At sampling site at 4, 17, 21, 22 and 29 high COD was found, in tube-well water sample in the present study7,8.

Higher COD level observed during Winter season as compare to summer season and followed in rainy season at various sampling stations due to waste material brought in during rainy season which gets deposited along the banks during summer, coupled with low microbial activity9,10. (Table 1 and 2). It's adversely affected on human health.

Table No.1 Chemical Oxygen Demand (mg/lit) in Tube-well water sample

stations	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1	50.60	320.40	6.65	273.30	45.38	55.70	30.06	52.80	38.04	35.60	38.49	35.90
2	20.37	7.28	7.80	225.20	8.70	18.12	60.80	35.47	37.37	20.48	30.25	20.34
3	80.95	80.75	21.05	25.94	55.70	45.70	28.20	20.35	45.07	20.41	31.37	20.30
4	191.30	620.77	162.24	60.98	102.28	140.17	85.20	87.37	140.09	91.40	30.04	70.58
5	125.30	84.90	72.32	20.73	60.65	81.72	45.47	40.38	47.70	39.40	57.08	172.04
6	106.80	44.30	110.78	26.94	27.25	70.80	43.62	50.70	46.18	40.60	60.09	98.26
7	20.74	8.60	19.80	27.91	3.40	90.25	50.23	54.78	46.69	35.66	12.07	21.43
8	40.35	8.48	25.29	20.63	25.65	18.26	14.70	16.72	35.36	20.26	21.32	37.42
9	42.60	7.25	20.25	22.40	25.20	28.30	18.75	20.40	38.41	38.40	26.07	76.70
10	66.18	15.42	31.25	30.25	35.37	37.40	20.56	22.42	36.50	36.50	20.05	50.35
11	53.25	36.81	20.25	18.35	25.30	30.37	21.44	21.5	87.37	87.32	80.9	42.73

								0			0	
12	47.40	42.38	81.65	85.40	80.44	90.40	160.17	90.43	106.13	100.42	87.20	35.81

Stations	Average	SD
1	70.49	49.49
2	106.45	183.74
3	48.28	48.52
4	69.84	86.70
5	41.28	29.14
6	58.93	36.87
7	48.27	40.78
8	42.78	25.54
9	58.74	33.89
10	47.20	28.79
11	41.24	24.44
12	56.82	43.68

Chemical Oxygen Demand (mg/lit) in tube-well water sample

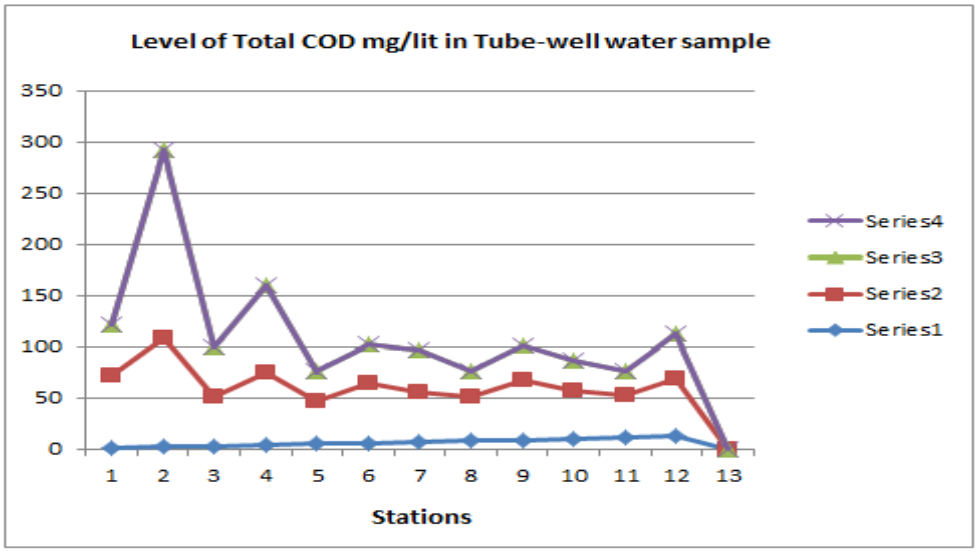

Figure 1: Chemical Oxygen Demand (mg/lit) in industrial water sample

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