



Research Article

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## Determination of BOD in the underground water

Amit Varale<sup>1</sup> and Yashodhara Varale\*<sup>2</sup>

<sup>1</sup>Department of Chemistry, Athaye, Sapre, Pitre College, Devrukh Dist- Ratnagiri.

<sup>2</sup>Department of Environmental Study, Dr. Ambedkar College of Commerce and Economics,  
Wadala –Mumbai-400031 (India)

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### ABSTRACT

During present investigation of ground water pollution was calculated with the measurement of level of Biological Oxygen Demand (BOD) contents. The ground water samples were collected from twelve ponds from Nipani town near sugar factory and analyzed every month throughout the year. So, we have studied levels of BOD in underground water. BOD was 62 mg/lit. The seasonal analysis indicated that the levels of BOD were generally higher in summer and winter than their levels in rainy season.

**Key Words:** Underground water, pollutants, sulphate, nitrate, Biological Oxygen Demand (BOD)

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### INTRODUCTION

Industrialization and urbanization created serious problems of water pollution of surface water i.e. ponds, underground water tube-wells. In developing countries like India, this problem has become acute day by day.

In the present study, the levels of BOD were studied in the vicinity of Halsiddhanath sugar factory located at Nipani [1-2]. 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 BOD[3-4].

### EXPERIMENTAL SECTION

BOD is the amount of oxygen required by bacteria, while stabilizing decomposable organic matter under aerobic conditions [5]. The decomposable of organic matter and metabolic activities of bacteria results in utilization of a part of the dissolved oxygen [6-7]. This depletion of oxygen is considered as a measure of the amount of degradable organic matter in the sample under analysis.

Hammer (1977) gave details about the BOD test for polluted water and treated effluents. This test was performed for the samples from industrial effluents in the present area under study. Reagents-

- a) Phosphate Buffer
- b) Magnesium sulphate
- c) Calcium chloride

d) Ferric chloride

#### Procedure

- Water samples which were acidic or alkaline were neutralized to PH 7.0 with 1N H<sub>2</sub>SO<sub>4</sub>/NaOH.
- Dilution water was prepared by aerating the distilled water till it became saturated with oxygen.
- Desired volumes of distilled water was placed in a suitable bottle and one ml each of phosphate buffer solution , magnesium sulphate solution , calcium chloride solution and ferric chloride solution were added per litre of water . Several dilutions of sample in the range of 0.1 to 1% were made to obtain required dilution.
- Three bottles A, B, C each of 300 ml capacity, were chosen and filled with dilution water and stoppered without formation of any air bubble in them. Dissolve oxygen content of bottle 'A' was determined immediately.
- Bottle 'B' was used as a blank and in bottle 'C' 2 ml effluent samples was added. These two bottles were incubated at 20C for five days.

Calculations-

$$\text{BOD} = (\text{Initial D.O} - \text{Final D.O}) / \text{ml of water volume of BOD bottles}$$

**Table 1: BOD (mg/lit) 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	10	40	6	60	55	20	10	11	12	11	12	10
2	5	32	120	20	2	19	12	13	13	14	16	11
3	8	90	16	21	4	13	8	9	10	11	12	8
4	40	87	280	45	105	50	35	30	29	32	35	25
5	16	37	18	43	4	26	15	16	17	18	19	14
6	20	35	50	8	7	24	14	16	18	16	18	12
7	10	29	28	10	13	30	16	18	20	20	22	17
8	5	30	60	14	18	6	5	4	5	4	6	4
9	12	28	61	12	14	9	4	5	7	8	8	6
10	15	40	11	55	55	0	8	10	12	7	10	7
11	12	26	3	8	8	8	6	7	8	8	9	29
12	16	34	20	4	4	50	30	35	36	33	34	25

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

Stations	Average	S.D
1	14	9
2	42	22
3	59	77
4	22	18
5	24	32
6	21	16
7	14	10
8	15	10
9	16	9
10	15	9
11	17	10
12	14	8

### RESULTS AND DISCUSSION

BOD is an indicator parameter to know the presence of biodegradable matter in waste and express degree of contamination [8]. Determination of BOD from sewage waste is very useful in identifying an appropriate methodology for waste water treatment and also to design facilities for disposal and reuse of sludge on land. (Techoanoglous1979). Whenever there is low DO content in water, normally high BOD is observed [9], since the basic aim is to degrade the organic matter. Therefore depending on BOD load [10], retention time of waste in a treatment plant is decided. Such variation in BOD is dependent on the availability of DO in water and the load of organic water [11-12].

The variations in the BOD were observed in industrial effluent samples, pond water samples and tube-well water samples, BOD values were lower except in February and April (Table no.1). This may be due to run off. In pond

water samples higher level of BOD, in February. high level of BOD and corresponding low level of DO is observed, clearly indicated that, the waste was mostly biodegradable and of human origin[13-14].

The high level of BOD was more than the desirable limit (30mg/lit) suggested by Bureau of Indian Standards.

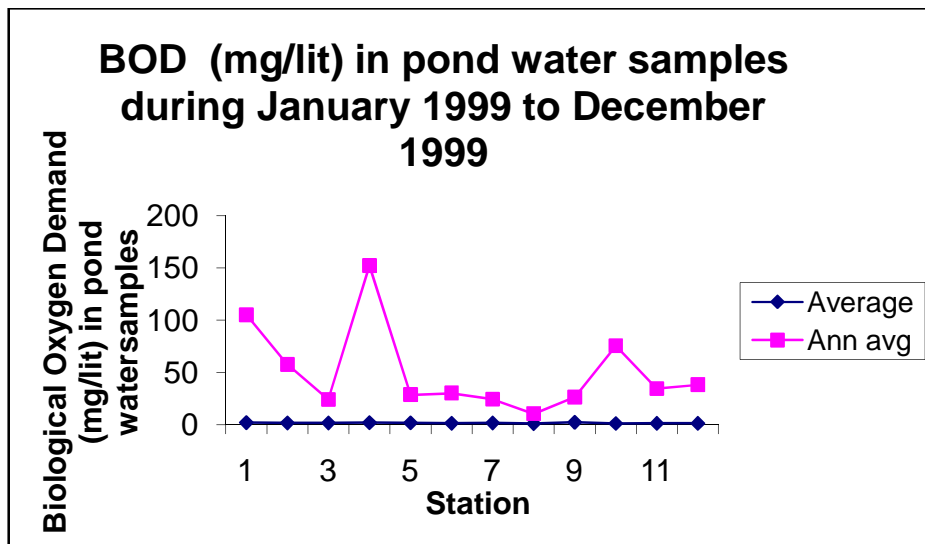


Fig. 1: BOD (mg/L) in pond water samples during

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