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SAMPLING AND ANALYSISING OF DISSOLVED OXYGEN IN WATER SAMPLES COLLECTED AT SUNDARAPURAM IN COIMBATORE DISTRICT

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ABSTRACT

Maintenance of dissolved oxygen at saturated level will help the growth and reproduction of normal population of fish and other aquatic organisms[1,2]. Due to increase of industries, it is necessary to monitor the DO level of water resources. This will help us to understand the present condition of water at various resources that are connected to the industries. In this study the water is collected from various resources around Sundarapuram in coimbatore district and they were subjected to dissolved oxygen study. The DO results of various samples were compared with DO of demineralised water which is taken as reference. Parameters such as temperature, hardness and aeration time that will affect the saturation level of DO are also discussed [6,7,8].

Keywords: Water pollution, Dissolved oxygen, Total Hardness, Aeration, Temperature, Coimbatore pond.

Academic Discipline And Sub-Disciplines

Engineering , Physical sciences

SUBJECT CLASSIFICATION

Chemical Properties

1. INTRODUCTION

Coimbatore city is considered as one of the major cities in Tamilnadu and it is well known for its industrial activities. The Noyyal river originates from the Vellingiri hills of the Western Ghats in Coimbatore and passes through Coimbatore, Erode and Karur districts of Tamilnadu and joins to the river Cauvery at Noyyal village in Karur district. The river has a length of 160 km and it has average width of 25m.Noyyal river and its connected tanks are the main sources of ground water which provide water for all the purposes in Coimbatore region.(Magudeswaran et al., 2005) found that the decrease in various quality characteristics clearly indicates the possibilities of pollution due to industrial activities [9,10,11,12,13]. The population of Coimbatore has also a strong impact on the Noyyal river with regard to pollution and due to this Noyyal river acts as a carrier for the pollutants. During the non-flow period of the river water can be stagnated and the pollutants may enter into the ground water. So the ground water quality gets depleted [14,15,16,17].

Rate of biological oxidation increases with temperature and oxygen demand increases accordingly[3,4], where solubility of dissolved oxygen is less. The low solubility of oxygen is the major factor that limits the purification capacity of natural water and necessitates treatment of waste water to remove pollution mater before discharge to receiving streams. Dissolved oxygen is the most important single test that environmental engineers and scientist use in most instance involving the control stream pollution it is desirable to maintain condition favorable for the growth and reproduction of normal population of fish and other aquatic organisms [18,19,20,21,22]. The factors affecting the amount of dissolved oxygen available in the river, oxygen demanding waste removes dissolved oxygen, photosynthesis adds dissolved oxygen during the day but these plants recover oxygen. In summer rising temperature reduce the solubility of oxygen important limiting factor for aquatic life zones include temporally sunlight, nutrient, availability at dissolved oxygen content [23,24,25].

Polluted water has always been a concern for the health of the people .There is seasonal variation of water quality is also noted .In the present situation, it is necessary to evaluate the environmental condition of living area periodically. This helps us to conclude the pollution level of water resources. By keeping in mind of the above facts, we choose sundarapuram in Coimbatore district. The aim of research was to correlate the dissolved oxygen content in water sample collected in sundarapuram in Coimbatore. The Objective is to find the optimum condition to increase the Dissolved Oxygen in various source of fresh water. Because dissolved oxygen is vital factor for aquatic organisms [26,27,28,29].

2. MATERIALS AND METHODS

2.1 Study area:

The area under study, Sundarapuram is the basin of river Noyyal which pass through district Coimbatore, Tamilnadu. It is located between latitude 10.9574 N and longitude of 76.9715 E respectively. The people of this area work mainly in agriculture and industries in nearest places. Experimental setup for this investigation is given in the block diagrm (fig 2.1).

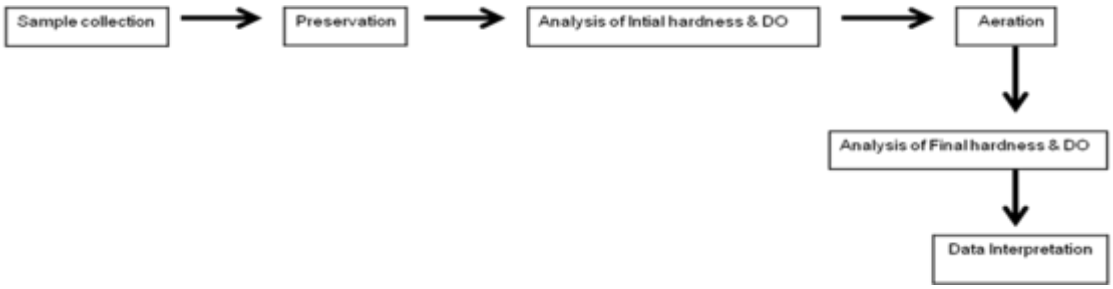

Fig.2.1. Block diagram of experimental setup for the present investigation.

2.2 Collection of Water samples:

A total of 5 water samples were collected from different water sources which are situated in and around Noyyal river basin and each water sample were sampled for study to analyze dissolved oxygen in the water. Additionally, distilled water is taken as standard to compare DO level. The samples are collected in clean polyethylene bottles and prior to collection, the bottles are rinsed thoroughly with sample water. The water samples are taken through pumping so the samples will be a representative and in order to avoid, only contamination from the surface of river basin [30,31,32,33,34,35].

3. EXPERIMENTAL METHODS

The DO content for the collected water sample was tested for total hardness by EDTA method. Then Initial and final DO of the collected water samples were identified by Winkler's method[5]. The collected water samples were aerated for about 5 hrs by standard aerating procedures[6 37,38,39,40,414243,44,47].

4. RESULT AND DISCUSSION

The solubility of oxygen in water depend of temperature, hardness and other impurities present in the water .The solubility of oxygen is less in salt containing water than it is in clear water . The dissolved level can be increased in water by aeration [45,46]. When aeration time increases the DO content also increases in water. The collected water samples were aerated for about 5 hrs. Aeration was done to differentiate the pollution level of collected Water sources. In-between, Increased DO level is estimated for every one hour of aeration in each sample by the iodometric titration [48,49.50]. The hardness of the samples were estimated to interpret the final DO after aeration. Tested parameters were listed in Table: 1.

Table 1. Parameters of collected water samples used in this study.

S.No.	Resource	Hardness/ppm	Temp/^{o}c	Intial Do	Final Do
1	Well	265	RT	0.33	5
2	Bore well	500	RT	2.32	4.8
3	Pond	128	RT	6	5.9
4	Distilled Water	23.5	35	0.88	1.5
5	DM water	20.8	RT	3.5	9.9
6	River water	15	RT	2.8	7.9

The well and bore well water are underground water source and have high hardness due to dissolved salts .Pond and river are source of rain water and shows less hardness. DM and distilled water are purified water and have very less hardness. These variation are seen in the above Fig 4.1.

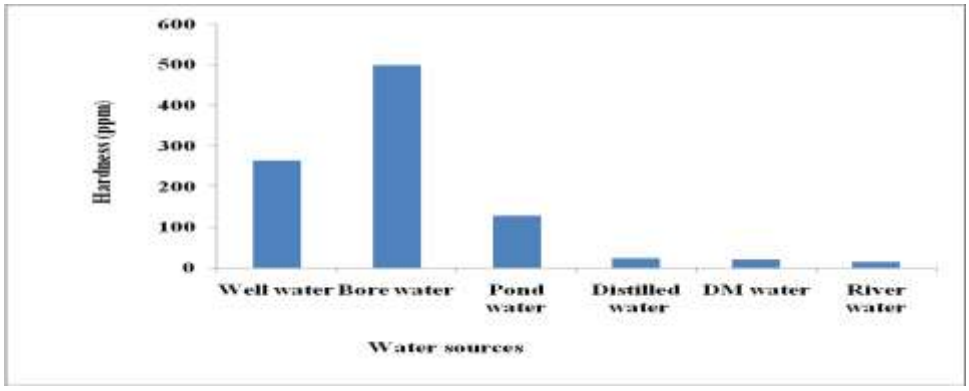

Fig.4.1. Hardness of collected Water samples in ppm

The DO content of the collected water samples suggested that the contamination of water samples based on their sources. During the aeration process, we have observed that water containing low dissolved salts will take more DO than water have high dissolved salts and it is also seen in comparison samples of low dissolved salts and de-mineralised water 20.8 ppm in the case of distilled water 23.5 ppm due to high temperature DO level is low after aeration. From this study it is very important to control dissolved salts and temperature at low level to maintain the saturated DO level in water resources.

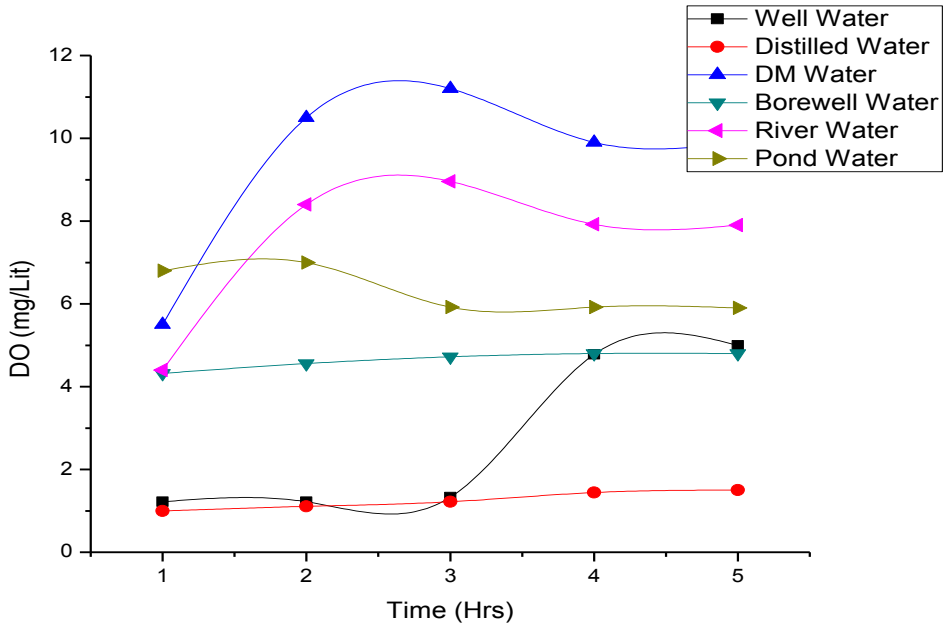

Fig.4.2. Variation in DO content with respect to aeration time.

Table 2. Variation in DO content with respect to aeration time of collected water samples used in this study.

Aeration Time (Hrs)	DO Content of Collected Water sources (mg/lit) at Room Temperature					Distilled Water DO at 35°C
	Well	DM	Bore Well	River	Pond	
1	1.22	5.5	4.32	4.4	6.8	1
2	1.22	10.5	4.56	8.4	7	1.11
3	1.33	11.2	4.72	8.96	5.92	1.22
4	4.78	9.9	4.8	7.92	5.92	1.44
5	5	9.9	4.8	7.9	5.9	1.5

5. CONCLUSION

Most of the water samples collected in river basin is evident in all physico-chemical parameters examined. In general all the parameters are not within the range of standard values prescribed by various agencies. The water of river is highly contaminated collected at all the stations, during the course of study and it is unfit for consumption, domestic and irrigation purposes. The highest hardness is found in bore well water collected from underground below 800 ft depth, high hardness is due to high dissolved salts, required about 5 hrs of aeration to lower the DO level to 5ppm but in well and pond water hardness is less in 15 ppm river water after aeration of 1 hr DO level is 7.9 ppm which is in the suitable range for survival of aquatic organism in river. In any water the life expectancy will depend on hardness of low level and low temperature particularly, discharging treated industrial waste water in to the water resource. Some steps are needed urgently to improve the quality of river and the present study suggests one of them as optimum aeration required for the discharging waste water. Present dilemma, the study clearly states the need of increasing aeration time and it should be implemented immediately in industries for life's welfare.

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