

ENVIRONMENTAL IMPACT OF ELECTRICAL CONDUCTANCE AND DISSOLVED OXYGEN OF EFFLUENT WATER IN DURG DISTT.

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Chhattisgarh state is a newly born state, Durg is the one of the district where small scale industries of cement pipe making, sponge iron plant, rice mill, bakery, oil mill, power plant is present. They throw their effluent into the stream, which pollute water in the vicinity. Any liquid effluents, when discharged will eventually find its way into the hydrological cycles and thereby can have adverse effects on the ecosystems and also on the quality of water to the consumer. It is important to bear in mind that the small size of the island means that very quickly water sources can be adversely affected by effluent pollution.

In this study the effluent water sample of various industries present at Borai and Bhilai Industrial area Durg Distt was taken. They were Beekay engineering works, Bhilai Tiles, Jayashree oil, Sant Bakers, Venkatesh rice mill, Ecophane Power plant, HEG sponge iron plant. The study was carried out in winter, summer and rainy season. The environmental impact of electrical conductance and dissolved oxygen was taken for study. The study shows that the electrical conductance of effluent in rainy season is lower, interpreting that the quality of effluent was good. The study shows that the dissolved oxygen tends to be depleted in deeper water and higher in rainy season. After the study it is interpreted that the quality of effluent water was good in rainy season and deteriorates in summer season because in summer season the temperature of water becomes high.

Experimental and Methodology: In this study the samples were taken from industries in different seasons. To perform the dissolved oxygen test and electrical conductance of a sample the sample should be used immediately after taking from site and E.C. of a sample is measured by a self contained conductivity meter.

Standard value of D.O. in fresh water is

S.No.	Season	Temperature	Dissolved Oxygen
1.	Winter	24° C	8.5 ppm (mg/l)
2.	Summer	40° C	6.5 ppm (mg/l)
3.	Rainy	30° C	7.7 ppm (mg/l)

Source: Derived from Standard Methods For the examination of water and wastewater.

Environmental Impact of electrical conductance and Dissolved Oxygen:

Electrical conductance: Conductance of a solution at any temperature depends upon only on the ions present, and their concentration. When a solution of an electrolyte is diluted the conductance will decrease, since fewer ions are present per milliliter of solution, to carry the current. The conductivity of pure water is about $5 \times 10^{-8} \text{ ohm}^{-1} \text{ cm}^{-1}$. The conductivity meter readings immediately indicate the level of pollution. Conductivity is the measurement used to determine a number of applications related to water quality.

These are as follows:

1. **Determining the mineralisation:** This is commonly called Total dissolved solids. TDS information is used to determine the overall ionic effect in a water source. The number of available ions in the water often affects some physiological effect on plants and animals.

2. **By noting variation or changes in natural water and wastewater quickly.**

Elevated dissolved solid can cause mineral taste in drinking water and also cause problems with industrial equipment and domestic plumbing. In direct effects of excess of dissolved solids are primarily the elimination of desirable food plants and habitat forming plant species. High dissolved solids can be a problem in water used for irrigation.

Criteria (Limit): The limit is 800 micromhos/cm or 500 mg/l total dissolved solid.

Dissolved Oxygen: Dissolved oxygen is necessary and needed for good water quality. Oxygen is a necessary element to all forms of life. Adequate oxygen levels are necessary to provide for aerobic life forms, which

carry on natural stream purification processes. As dissolved oxygen level drop below 5.0 mg/l, aquatic life is put under stress. The lower the concentration the greater the stress. Oxygen levels that remain below 1-2mg/l for a few hours can result in large fish kills. Total dissolved oxygen concentration in water should not exceed 110%. Concentration above this level can be harmful to aquatic life. Fish in water containing excessive dissolved gases may suffer from gas bubble disease. However, this is a very rare occurrence. The bubbles block the flow of blood through blood vessels causing death.

In nutrient rich water body the dissolved oxygen is quite high in the surface water due to increased photosynthesis by the large quantities of algae. Dissolved oxygen tends to be depleted in deeper water because photosynthesis is reduced due to poor light penetration, due to dead algae which falls down the bottom using the oxygen as it decomposes.

In nutrient poor water the difference in dissolved oxygen from surfaces to bottom, is exaggerated in the summer when thermal layering occurs which prevent mixing. The surface becomes saturated with oxygen (approx.100%) and the bottom anoxic (virtually no oxygen).

Criteria (Limit): Water quality criteria for aquatic life require that the average dissolved oxygen remain above 5.0mg/l and that the instantaneous minimum not fall below 4.0mg/l.

Result: From above table we conclude that

1. The quality of effluent water is good in rainy season.
2. In summer the quality was worst.

Discussion: The low value of electrical conductance in any sample shows that the quality of effluent was good because low E.C. means that in effluent the dissolved ionic species .The higher value means that at that sample the value of ions was more.

The low value of dissolved oxygen affects the portability of effluent water and cause killing of fish and other animals of sea kingdom. It shows the sanitary status of water. The D.O. also shows whether the process undergoes a change are aerobic or anaerobic. A good water should have the solubility of oxygen about 15mg/l at 0⁰c and 7mg/l at 35⁰C.

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Name of industries	Sample	Electrical conductance			Dissolved oxygen		
		Winter	Summer	Rainy	Winter	Summer	Rainy
Bhilai Tiles	I	10	2.5	0.5	7.0	2.0	6.5
Beekay Engg. Works	II	1.5	2.93	0.93	8.5	3.0	7.0
Jayashree oil	III	9.85	13.05	1.05	6.5	0.2	5.2
Sant Bakers	IV	15.36	0.94	0.25	6.0	4.0	4.9
Ecophane power plant	V	6.73	4.91	0.50	8.0	0.3	6.8
Venkatesh Rice Mill	VI	2.9	3.26	0.31	9.0	0.2	7.5
HEG Sponge iron plant	VII	1.8	1.55	0.45	7.2	3.0	5.5

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