



Study on Physicochemical Parameters of Brewery Industry Effluents of M. I. D. C. Aurangabad

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Abstract

The physicochemical parameters of effluents of brewery industry situated at M.I.D.C. Waluj, Aurangabad (M.S.) have been studied for three months. The result indicates that the parameters like Temperature, TDS, TSS, DO, BOD, COD, Chlorides, and Sulphates in untreated effluents are above ISI limit. The investigation of parameters of treated effluents shows that they are within permissible limit and water can be used for irrigation purpose.

1. Introduction

Water is the basis of life. In India dams, lakes, ponds, and groundwater can be used for domestic, agricultural, and industrial purposes. The overexploitation of these resources has produced several environmental problems and water pollution is one of them. In developing country like India industrialization is the need of the hour but it has created the uneven distribution of population leading to urbanization which adversely affects the environmental resources and ecological system.

The water resources are contaminated by biological and industrial pollutants. In brewery industries, beer and other breweries of low alcoholic content products are manufactured. In brewery plant, the major effluent is fermentation residue. Effluents are also manufactured from yeast preparation, yeast recovery, washing of brewing vessels and bottles. The quantity of effluent water produced from brewing is about 8 to 12 times the volume of beer produced. The effluents

from brewing plant are usually acidic and contain appreciable quantities of carbohydrates and consequently, its BOD is high. The effluents of dairy industries were analyzed by others^{1,2}.

The present study aims to analyze physicochemical parameters of untreated and treated effluents.

2. Materials and Methods:

The M.I.D.C. Waluj, Aurangabad (M.S.) area was selected for a present study where various industries are situated and selected brewery industry is one of them. The water samples were collected manually in polythene bottles³ inside the plant at regular intervals i.e. during Oct. Nov. and Dec. and analyzed for various physicochemical parameters like pH, TS, TDS, TSS, DO, BOD, COD, Chlorides and sulphates.

The physical parameters like pH and Temperature were measured with pH meter and thermometer on the spot. The dissolved oxygen in the samples was determined by

Winkler method⁴. The total solids and total dissolved solids were determined gravimetrically. The chemical oxygen demand was estimated by dichromate oxidation method⁵. The chlorides and sulphates were determined Mohr's method and UV visible spectrophotometer respectively. The chemicals used for analysis were of AR grade. The double distilled water was used for the preparation of solution and analysis of samples.

The Brewery has got its treatment plant; the study of treated water was also carried.

3. Result and Discussion

The standard and observed values of physicochemical parameters of treated and untreated effluents of brewery industry are shown in Table 1.

The temperature range of untreated water is 31° C to 33°C, while after treatment it is in the range of 27° C to 29 °C. The pH is one of the important factors affecting the flora and fauna. The different processes carried out in industry affects the pH of effluent. In the present investigation, the pH of untreated effluent was acidic while that of the treated effluent pH increases up to 8.0. The values are within the permissible limit. The Total Solids of untreated effluents ranges from 2768 to 2793 mg/L while after treatment it falls to 1917 to 1972 mg/L indicating that they had crossed the limit.

There was a very high content of total dissolved solids in the untreated effluent (2964-2996 mg/L) and treated effluents (1962-1972 mg/L). The dissolved oxygen in water is due to diffusion of oxygen from the atmosphere to water, it is an indication of the ability of water to support to support biological life. The dissolved oxygen content

in the untreated effluent was absent indicating that the effluents were heavily polluted with organic material but after treatment, the DO has been raised to 3.5. Same results were obtained by Elizabeth1 and Pandit 2 for dairy effluents. The BOD values of untreated effluent are high (i.e.387-390 mg/L) but after treatment there is fall in values (i.e.76-80 mg/L). The untreated effluent has high COD values in the range 2108-2137 mg/L and after treatment; it falls to 240-248 mg/L. The high values of BOD and COD in untreated effluent shows the presence of organic pollutants but after treatment, the values are in the permissible limit.

The chloride content in the untreated effluent was at toxic level i.e. 683-689 mg/L but after treatment, it has come down to 421-425 mg/L which is in the permissible limit. The excess of chloride is troublesome in irrigation water and also harmful to aquatic life. The objectionable values of sulphates are >150 mg/L, in present investigation the sulfate values of untreated effluent are at higher level 154-179 mg/L but after treatment, it has been decreased to 89-97 mg/L. after treatment, both chlorides and sulfates are intolerance limit for irrigation⁶.

4. Conclusion

The results of present study showed that quality of the wastewater from this brewery plant is high in TS,TDS; and DO is less content does not meet required effluent regulatory standards. Therefore, there is an urgent need to treat the brewery wastewater in order to protect environment and to reduce the cost of penalties to that industry may deserve when it discharges effluent into municipal wastewater treatment plants. From the present results, the TS,TDS and less DO ratio indicated that the effluent is a high solid deposit which is biodegradable.

Table No. 1 Physicochemical Parameters of Treated and Untreated Brewery Effluents

Parameters	Permissible Limit	Untreated Effluents			Treated Effluents		
		Oct.	Nov	Dec.	Oct.	Nov.	Dec.
pH	5.5-8.5	6.3	6.3	6.2	8.0	7.9	8.1
Temp°C	27-30	33	31	32	29	28	27
TS	1500	2793	2797	2768	1920	1923	1917
TDS	1500	2990	2996	2964	1964	1972	1969
DO	7.0 0	0.0	0.0	0.0	3.5	3.6	3.5
BOD	100	387	393	390	76	80	79
COD	250	2108	2115	2137	240	243	248
Chlorides	600	683	687	689	421	423	425
Sulfates	150	154	173	179	89	97	93

*All the parameters are in mg/L except pH and Temperature

5. References

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