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Short Communication

CHARACTERIZATION OF A TREATED DISTILLERY EFFLUENT

D. R. Khanna, R. Bhutiani and Paritosh Kumar

Department of Zoology and Environmental Sciences, Gurukula Kangri Vishwavidyalaya
Hardwar-249 404, India

ABSTRACT

Effluent from distilleries, called spent wash, contains a large amount of dissolved organic matter. As this organic matter is readily decomposed by biological action, its discharge into surface water causes serious damage to aquatic life. The spent wash is highly acidic in nature. Looking the present crisis of pollution from distillery effluent, the urgent need for suitable abatement of pollution in distilleries is obvious, especially where some of the parameters viz. BOD, COD, total solids and suspended solids are extremely high in comparison to the limits prescribed. The present paper deals with the characteristics of a treated distillery effluent released from an industry.

Distillery industry is one of the major contributors towards pollution. "All India Distillers Association" has listed 212 distilleries, which have an annual production of about 6500 million liters of alcohol. Maximum number of distilleries are located in Maharashtra followed by Uttar Pradesh.

Use of molasses generates a waste water, called spent wash, containing highly biodegradable dissolved solids, high ash content, high temperature, low pH, high concentration of potassium, calcium, chloride and sulphate ion. The obnoxious smelling, discoloured spent wash is rich in organics with acidic pH and is amongst one of the most serious waste waters creating problem in treatment and disposal. To meet the legislative standards, it is required to undergo intensive treatment procedures prior to discharge in order to prevent pollution of land and water.

For the study a typical distillery, named Daurala Distillery, situated at Meerut (U. P.) was selected. It manufactures and produces many types of alcohol. The Samples were collected from three sites (site III as central) outside the factory boundary after treatment. The effluent from this factory discharges into a drain. Physico-chemical and microbial parameters were analyzed according to Standard methods of APHA (1998), Trivedy & Goel (1986) and Mathur (1982).

The results of various physico-chemical and microbiological parameters are given in Tables 1 and 2. The average value of pH was recorded maximum at site III (6.30). Values of pH at site I and II were slightly lower in comparison to site III. Same observations were also reported by Pravin & Srivastava (1995) and Patil (1998).

The average value of turbidity at site III was found to be (87.3 JTU) which was much higher than ICER limits. Average value of total solids at sites I, II and III were found to be 1183 mg/L, 1117 mg/L and 1045 mg/L respectively. The maximum average value of TDS and TSS were reported to be 680.00 mg/L and 503.6 mg/L at site I respectively. Average values of free CO₂ at sites I, II and III were found to be 55.32 mg/L, 53.56 mg/L and 52.20 mg/L and dissolved oxygen was absent at all the sites.

The average value of BOD decreases from site I to site III. Maximum value was observed as 318.00 mg/L and minimum as 244.66 mg/L. Maximum value of COD was observed at site I (468.00 mg/L). Value of COD decreases with the distance. Maximum value of calcium was found 90.09

Table 1: Observations of physico-chemical parameters of Daurala distillery, Meerut (U.P.) at different sites.

Parameters	Sites I	Sites II	Site III
pH	5.90 ± 0.58	5.94 ± 0.52	6.30 ± 0.24
Turbidity (J. T. U.)	94.20 ± 13.67	92.20 ± 10.10	87.30 ± 6.22
Total solids (mg/L)	1183.00 ± 316.17	1117.00 ± 261.3	1045.00 ± 232.91
Total dissolved solids (mg/L)	680.00 ± 137.70	619.20 ± 118.58	593.20 ± 127.13
Total suspended solids (mg/L)	503.60 ± 187.95	497.80 ± 178.39	451.80 ± 119.85
Free CO ₂ mg/L	55.32 ± 9.08	53.56 ± 11.67	525.20 ± 15.26
Dissolved oxygen (mg/L)	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
BOD (mg/L)	318.00 ± 25.25	310.88 ± 34.04	244.60 ± 77.55
COD (mg/L)	468.00 ± 33.56	462.40 ± 38.49	364.80 ± 115.11
Calcium (mg/L)	90.09 ± 8.13	87.41 ± 4.93	87.37 ± 10.33
Chloride (mg/L)	251.05 ± 31.34	252.19 ± 25.91	244.16 ± 42.40
Magnesium (mg/L)	466.70 ± 28.52	456.03 ± 36.21	443.56 ± 38.77
Total alkalinity (mg/L)	66.80 ± 2.99	64.60 ± 3.32	63.20 ± 3.75
Inorganic phosphorus (mg/L)	0.41 ± 0.06	0.39 ± 0.05	0.32 ± 0.07
Sulphate (mg/L)	64.44 ± 1.90	58.44 ± 1/84	46.94 ± 1.59

± = Standard deviation

Table 2: Observations on microbial parameters of Daurala distillery treated effluent at different sites.

Sites	SPC/mL
I	5.12 ¹² ± 3.65 ¹¹
I	4.68 ¹² ± 4.30 ¹¹
III	5.12 ¹² ± 2.31 ¹¹

± = Standard deviation

In the present study the S.P.C. at site I, II and III was found to be 5.12¹²/mL ± 3.65¹¹), (4.68¹²/mL ± 4.30¹¹) and (5.12¹²/mL ± 2.31¹¹) respectively.

The study reveals that majority of parameters are within the limits but some parameters like turbidity, TSS and BOD are beyond the limits of discharge standards. Therefore, it can be concluded that a more efficient treatment plant should be set up for the effluent of Daurala distillery.

REFERENCES

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mg/L. Maximum value of chlorides was 252.19 mg/L at site II, and maximum value of magnesium was 466.70 mg/L. Values of alkalinity at sites I, II and III were 66.80 mg/L, 64.60 mg/L and 63.20 mg/L respectively.

Value of inorganic phosphorus was found at site I as 0.41 mg/L, at site II as 0.39 mg/L, and at site III as 0.32 mg/L. Value of sulphate at site III was found as 46.44 mg/L which was under the limits of ISI.