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Chemical Study on Distillery Effluent to Assess Pollution Load

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ABSTRACT: Water pollution is one of the major issues for the whole world scenario or it is one of the major threats towards environment. Anything or substance by which the water gets contaminated is termed as water pollution. Several industries releases huge amount of solid and liquid waste which directly mixed with the water and causes pollution. According to a report, Government of India declared distillery industry as a highly polluted industry. This distillery waste effluent will have Low DO with high BOD, COD, TSS which have adverse impact on environment and this waste effluent were not properly treated and directly dumped in water sources due to which the quality of water gets badly affected and this water cannot use for drinking purpose as well as for irrigation purpose and it also affects aquatic life. If the waste water of distillery industries is treated properly then it again re-used and re-cycles which also prevent pollution.

Keywords: Distillery industry, effluent, BOD, COD, TSS, DO, pH.

I. INTRODUCTION

Healthy environment is of primary requirement for not just human beings but also for animals and plants and therefore, it should be held as sacred trust and it should be conserved and improved for the well being of present and future generations. Water pollution is defined as "anything causing or inducing objectionable conditions in any water source and affecting adversely, any use or usage to which the water there of may be put." Distillery industries are the agro-based industries with high organic and inorganic contains which are high strength based and difficult to disposed. Ethanol produces as high products in the distillery. Now a day's distillery Industry is the major source of water pollution. Basically distillery industry is related with fermentation industry which is a biological process in which micro-organism to produce different types of alcoholic products. In distillery industry mainly wine, alcohol is produced the production capacity of this industry varies from thousands of lit/day.

The products which are obtain from distillery industry they will support several other industry like solvent for paint industry, sterilizing and antiseptic agent for medicines and hospitals, flavor enhancement for food industry, backing industry.

Distillery industry is unique because it uses several waste products and the products of this industry are used in several other industries but still this industry has adverse effect on environment. The products of distillery industry are may be molasses or non-molasses waste which are formed by fermentation process. If distillery industry uses molasses then its waste contain large amount of organic and inorganic when it mix with water then it causes water pollution. The waste which is obtained from distillery industry when it mix with water then it will have extremely high BOD value and high COD, high chlorides and sulphates, dissolved solids, brown reddish colour with bad odour.

In India nearly about 200 distillery industries present which releases a thousands liter of waste, such huge amount of waste will cause serious hazard to environment, hence treatment of distillery waste should be essential. By proper treatment of effluent we can reduce the organic pollution in water up to some extent.

II. MATERIAL AND METHOD

Sample of waste water is collected in a plastic container and stored below 6°C at the point where it is discharged into the holding dam. Sampling is done at the interval of 3-4 hours. These samples analyzed with standard procedure.

III. RESULT AND DISCUSSION

In Our study we find that the effluent water is found to be highly polluted and having very high Chemical &Biological Oxygen Demand (COD and BOD),and the dark brown reddish colour indicates high content of organic and inorganic pollutants. When this effluent discharge into natural water bodies and it causes water pollution and shows adverse effects towards environment. Some of the Contaminants, such as certain level of minerals or compounds are not harmful to human health, but if they are present in large amount then they affect human health. Colour and odour of the effluent of distillery was red brown in colour with unpleasant odour of Idol, Skatol and other sulphur compounds.

The effluent taken from various sites of distillery industry at different time has analyzed. The distillery is unique in the sense that the each distillery produced a different pollutant and the same distillery has entirely different effluent. The value of temperature, pH, DO, COD, and BOD, T.S.S., T.S., Na, K, were determined by chemical analysis.

The temperature of effluent was found between 26.63^0C-28^0C. The colour of distillery effluent is dark radish brown with high load of organic matter. The spent wash has a typical unpleasant odour of fruity smell. The fermentation process is a basic process adopted in distillery industry so effluent was found in acidic range around 7 pH. The range of DO in the distillery effluent was around 0.3; mean while the recommended BIS range 4-6 the low percentage of DO is possibly due to high organic matter. The BOD and COD value in effluent was around 645-675 PPM, 2480-2520. This is also due to high organic load. The total solid (T.S.) in effluent is 5300-6100 and T.S.S. range is 300-325. The effluent contain good amount of 'K' and 'Na' and Sulphate.

Impact of distillery industry effluent on environment:

Discharge of waste water with high TDS would have adverse effect on aquatic life and un suitable for drinking purpose high amount of BOD and COD in the waste water leads to the decomposition of organic matter under the anaerobic condition that produced highly objectionable product CH_4 Ammonia (NH_3), H_2S, low DO in water affect the aquatic life and reduces the acceptability of water for domestic purpose. The range of pH is also affect plant growth and crop growth when waste water used in irrigation.

Table 1: Physico-Chemical analysis of distillery waste water (effluent) sample.

S. No.	Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1	Temperature	27.00	27.50	26.63	27.80	28.00
2	Colour	B. Reddish	B. Reddish	B. Reddish	B. Reddish	B. Reddish
3	pH	7.50	7.20	7.10	8.00	8.20
4	D.O.(ppm)	0.3428	0.2545	0.3126	0.4231	0.3862
5	B.O.D. (ppm)	660	645	670	675	655
6	C.O.D.(ppm)	2480	2510	2495	2520	2470
7	T.S. (ppm)	5300	5510	5590	5980	6100
8.	T.S.S. (ppm)	300	308	314	325	319
9.	Sodium	440	288	291	371	382
10.	Potassium	6466	6545	6678	6590	6610

VI. CONCLUSION

Distillery industry plays an important role for us and several products we obtain from it , but due to excessive use of its products large scale production is required. To meet this huge demand large scale industrial setup is must which results in excessive amount of waste effluent which is not properly treated and directly drained out to water sources which hazardously affecting the quality of water hence to overcome this problem treatment of waste effluent from distillery industry is must required.

Distillery effluent contain organic nutrient rich solution, it has a wide spectrum of utility. The use of spent wash as a substrate from biochemical product

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