

# Analysing Water Quality Parameters for Liquid Waste from Distillery

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**Abstract**—The effluent that are originated from distillery are very harmful in nature. Many distillery effluent are dispose into the river or stream without proper treatment which cause change in physical, chemical, and biological characteristics of river/stream. The effluent generated from the distillery is also known as spent wash lead to more water pollution .Industrial waste create a variety of water pollution which is more difficult in treating and more costly the present study is under take to assess the level of physical chemical parameter of distillery spent wash. The parameter is compare with Bureau of Indian standard. Untreated effluent have high BOD rate but low DO rate. The untreated effluent have more harmful to plant so it is no permissible to irrigation the treated effluent is under permissible limit and less toxic and it is use as irrigation purpose. This study was conducted to know the physical and chemical characteristics of distillery waste water like Biological oxygen demand, chemical oxygen demand, turbidity, pH, alkalinity, total dissolved solid, Total suspended solid, total solid, chloride. The average values of pH, Turbidity, Acidity, Chloride, Hardness, Total Solid, BOD, DO, Alkalinity are found out. Distillery industries in India pose a very serious threat to the environment because of the large volume of wastewater they generate which contains significant amount of recalcitrant compounds. Distillery spent wash has very high COD and BOD with low pH and dark brown color. The treatment of spent wash using various treatment technologies and reactor configurations has been widely explored.

## 1. INTRODUCTION

Large amount of dissolved organic matter is present in effluent of distillery. With the help of biological action organic matter is readily decompose, consequently its causes serious damage to aquatic life when distillery effluent is discharge into the stream. In India there are about 145 distilleries, a state wise producing ethyl alcohol by fermentation of molasses and subsequent distillation of the fermented wash. The fermentation is carried out by yeast, which convert the sugar present in the molasses into alcohol while the sludge settle down at the end of the process.

The color of the waste water of distillery is dark brown instead of color the spent wash of distillery have high biological oxygen demand, high chemical oxygen demand, high suspended solid, and inorganic solid but low value of pH. The typical range of biological oxygen demand (BOD) 35000-

50000 mg/l and the typical value of chemical oxygen demand (COD) are 100000-1500000 mg/l. all different industries have set there norms for effluent discharges. Due to increasing industrialization the no of pollution is increase like air pollution, noise pollution, water pollution. The increasing level of water pollution is more dangerous to environment and living things. Most of the industries discharge the waste water in the stream without proper treatment which causes more water pollution. Around the industrial area soil and underground water is polluted and due to soil pollution by nearby industries the crop growth rate decreases. Water pollution also increases due to standard of living being, high profile person have high rate of demand of water supply per day. The demand of water supply increases per year due to this led to scarcity of water in the world. . In the world various standards are laid down by agency after analyzing the water quality for different use such as (WHO) world health organization, U.S Environmental Protection Agency (USEPA), the Bureau of Indian standards (BIS) the Indian Council of Medical Research (ICMR) etc.

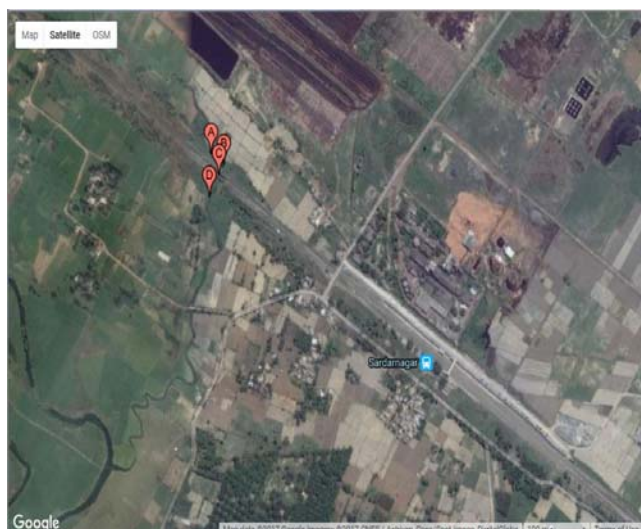


Fig 1 Map of Study Area

For existence of life on the earth water is one of the most important components. For all human being in the world fresh and clean drinking water is needed for survival on the earth, but sadly millions of people are deprived by fresh water in the world. Today in the entire world all the living (being) flora and fauna need water for survival.

## 2. MATERIAL AND METHODOLOGY

### 2.1 WATER SAMPLING PROCEDURE AND ANALYSIS

Water samples were analyzed for various parameters in the Environmental Laboratory Engineering, Madan Mohan Malviya University, Gorakhpur, various physical and chemical parameters like Temperature, pH, turbidity, total dissolved solids (TDS), total suspended solids (TSS) Hardness, biochemical oxygen demand (BOD), disoured oxygen (DO), fluoride, alkalinity have been monitored for the waste water of different places. Plastic bottles with a capacity of 1.5 liters with a stopper were used to collect samples. Each The bottle was washed with 2% nitric acid and was washed three times with distilled water. This The bottles were then preserved in a clean place. The bottles were filled with no air space, and So the bottle was stopped to stop any leakage. Each container was clearly marked with Name and date of the sample.

### 2.2 Physical and Chemical methods of analysis for distillery industry wastewater

**Table 1: Analytical Methods adopted for Distillery Industry Wastewater Analysis**

s.no	parameters	Method used	Experiment used
1	pH		
2	BOD5 @ 20°C	Dilution method	Volumetric glassware's, BOD Bottles, Incubator
3	COD	Open reflux method	COD apparatus, Round Bottom Flask
4	DO		
5	TDS	Gravity metric method	Gooch Crucible and electronic Balance, Burner
6	TS	Gravity metric method	Gooch Crucible and electronic Balance, Burner

7	TSS	Gravity metric method	Gooch Crucible and electronic Balance, Burner
8	Chloride		

## 3. RESULTS AND DISCUSSIONS

### 3.1. pH VALUE

The pH is measure the alkalinity or acidity and hydrogen ion concentration of the sample. The low pH below 4 indicates acidity and above 7 indicates alkalinity. In the present study the pH value varies from 2.2 to 3.8. According to B.I.S 1998 the pH value is 5.5 to 9.0 when they are discharge into the stream or on land for irrigation purpose.

### 3.2. BIOCHEMICAL OXYGEN DEMAND VALUE

BOD means the total oxygen require of bacteria to decompose the organic matter under aerobic condition. In this study the BOD value is varies from 1419.15 to 1763.89mg/l. The average values according to B.I.S 1998 of biochemical oxygen demand are 30000mg/l to 70000mg/l. But according to CPCB the BOD of discharge spent wash for irrigation purpose on land are 100 mg/l and 30 mg/l for disposal into inland surface.

### 3.3. COD VALUE

The oxygen require to oxidize the organic matter present in given waste water. But in this study chemical oxygen demand of the waste water varies from 2617.53 to 3512.90 mg/l. But the average value of chemical oxygen demand of spent wash is 70000 mg/l to 98000mg/l. According to average value of COD is 500 mg/l after dilution.

### 3.4. Dissolved Oxygen

The determination of DO is very important before discharging the waste into the stream. The 4ppm DO is sufficient for aquatic life in the stream, otherwise it have adverse effect on fish. In this paper the value of Dissolved Oxygen is 2.2 to 3.8 mg/l. According to CPCB the value of dissolved oxygen in spent wash which are discharge on land surface for irrigation purpose are from 4ppm to 6ppm.

### 3.5. TOTAL DISSOLVED SOLOD

In the study area the total dissolved solid is varies from 361mg/l to 461mg/l. The average value of TDS of distillery waste is 58000mg/l to 76000mg/l and 2100mg/l on land disposal after treatment.

### 3.6. TOTAL SOLID

Total amount of solid may be defined as evaporating the sample and weighing the left material. The mass of left material is divided by the total volume of the sample and it is denoted in mg/l. the sample of waste water is evaporated at 105°C in the ballast furnish. According to B.I.S 1998 TS

range from 80000 mg/l to 90000mg/l and 2200 mg/l on land disposal after treatment.

### 3.7. TOTAL SUSPENDED SOLID

Suspended solid may be define as those solid which are retain by passing the sample through 1 $\mu$ m pores and therefore also called as non filterable solid. In this project the TSS varies from 199mg/l to 318mg/l. But the TSS is 100 mg/l after treatment by CPCB.

### 3.8. CHLORIDE

In this project the average value of chloride is range from 78 mg/l to 99 mg/l. But according to CPCB the chloride range of spent wash is 5000 mg/l to 6000 mg/l. The treated spent wash of distillery waste which is dispose on land is in range from 50 mg/l to 100 mg/l.

## 4. CONCLUSION

The main objective of this project was analyse the physical and chemical characteristics parameter of distillery waste water.

The pH range from 6 to 6.5. According to CPCB distillery effluent standard prescribed limit for irrigation purpose is 5.5 to 9.

The Turbidity, TDS and TSS ranged from 145 to 182 NTU, 261 to 361 mg/l and 199 to 318 mg/l respectively. The value of Turbidity was found to be within the prescribe limit.

The DO and BOD were in the range of 2.2 to 3.8 mg/l and 1419.33 to 1763.89 mg/l. The prescribe value DO for irrigation purpose according to CPCB are 2ppm to 5ppm .But the prescribed value of BOD of distillery effluent for irrigation purpose 100mg/l in this project the BOD value is above the prescribe value.

Rise in BOD value due to presence of organic matter that are not oxidise during the treatment process

The COD and Alkalinity were in the range of 2617.53mg/l to 3512.90mg/l and 283mg/l to 340mg/l respectively. The parameters studied resemble the distillery effluent waste water quality.

High COD value may occur because of the presence of inorganic substance with which the dichromate can react.

In addition agricultural, industrial, waste water discharge to surface water are a source of chloride.

Alkalinity in waste water result from the presence of hydroxide , carbonate and bicarbonate of element such as calcium, magnesium, sodium, potassium and ammonia.

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