

# Evaluation of pollution assignment



It is concluded that the waste water being discharged by Harlan Distillery is highly polluted and it exceeds the prescribed limits for irrigation and public use. The percentage of sodium exceeds the desired limit for irrigation. Kelly's ratio, magnesium ratio and sodium absorption ratio are above the limits for irrigation. Hence the distillery effluent is to be treated before discharging it in to the Western Yamaha Canal, a source of irrigation.

Key Words : Distillery effluent , Irrigation Water Quality Indices, Water Quality Parameters water Quality Index, Pollution load Distilleries are allied industries of sugar cane factories which produce byproducts such as molasses , baggag'e's and fiber cakes. Among these products, molasses is most important because it is used for fermentation in stiller , for fertilizer industries and as feed for domestic animals.

In distilleries molasses is used as raw material for the production of alcohol and besides producing alcohol, produce largest amount of effluent. Alcohol is separated by the process of distillation and the residual liquor is discharged as distillery effluent. This effluent is highly colored, acidic and has high percentage of organic and inorganic material both in suspended and dissolved form. About 12 to 14 liters of effluent is being produced for every liter of alcohol produced , adversely affecting the surrounding ecosystem of hat region.

It imparts toxicity to the soil when used for a long time on the same land. This highly colored distillery effluent produces amino compounds and polyphonic compounds. It affects the penetration of light in to water and \*  
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damage to the aquatic ecosystems, 5 . Melatonin present in effluent is highly stable and is not decomposed by conventional treatment process which results in high COD, which is a serious problem of pollution.

The distillery effluent depletes the DO of a receiving water body because it has high percentage of organic matter. This makes the water body highly detoured. This condition in the water body results in killing of fish and destruction of flora and fauna. After prolonged discharge of distillery effluent, the water body becomes a dead pool of water, which may be due to following reactions? Carbohydrate + O<sub>2</sub> Fat + O<sub>2</sub> Bacteria Bacteria Bacteria methods suggested by Thwait and Alai.

These indices (SARA, SSP, KERR, and MR.) were calculated according to following equations Sodium Absorption Ratio (SARA) - Soluble Sodium Percentage (SSP) =  $\frac{Ca}{Ca + Mg} \times 100$  (An MGM 2 Kelly's Ratio (KERR) =  $\frac{Ca}{Ca + Mg} \times 100$  Mager ) Magnesium Ratio - -  $\frac{Mg}{Ca + Mg} \times 100$  Mager Ana CHIC + H<sub>2</sub>O con H<sub>2</sub>O con + H<sub>2</sub>O + NH Bacteria RESULTS AND DISCUSSION The average values and range of various physics-chemical parameters for distillery effluent have been summarized in Table 1 along with permissible values prescribed by IBIS for irrigation The average values of pH for distillery effluent is found to be 6. 20 which is slightly acidic.

The permissible range of pH prescribed by IBIS is 5. 5-9. Hence the pH of distillery effluent is within remissive limit. The average values and range of SEC have been found to be 5154. Oomph/CM and 2820-12620mmho/CM respectively. These values are well above the tolerance limit of 3000 IMHO/CM prescribed by IBIS. This high value for SEC indicates that the

distillery effluent contains large amount of dissolved salts. The high percentage of dissolved salts as indicated by high value of SEC adversely affects the soil fertility. Thus distillery effluent is not suitable for irrigation.

The average value and range for TTS have been found 1 5386. 60 pump and (6760. 24?? 39904. 0) pump respectively. Due to high value of dissolved solids in distillery effluent the average value and range for TTS of distillery effluent have also been found to be very high I. E. 22230. 2 pump and (9968. 40-60082. 70) pump. The TTS values have also been found to be very high I. E. 7164. Pump and (3100. 421 286. 40) pump The values oft, TTS and TTS protein + O<sub>2</sub> Other organic materials + O<sub>2</sub> con + H<sub>2</sub>O + Energy It is obvious that distillery effluent is highly polluted and needs treatment before discharging it to the water body.

A similar situation of distillery elution exists in Yamaha Magna which is the second biggest industrial belt of Harlan. The Harlan Distillery at Yamaha Magna discharges huge amount of effluents in to Western Yamaha canal polluting it severely. In this paper we have studied the physics-chemical parameters of distillery effluent and have observed their impact on surrounding ecosystem. MATERIAL AND METHODS Distillery effluent samples were collected from the exit point Of Harlan distillery twice a month from Gauge 2006 to Feb. 2007. After processing the samples were analyzed for various physiochemical parameters such as pH,

SEC, -RSI, TTS, TTS, HTH, TA, CLC-, SASS-, IPPP-, An+, K+, ca+, MGM+, BODY and COD as per standard methods prescribed by PAPA W . The water quality indices were calculated according to the 370 are very high for distillery

effluent and are above the permissible limits of IBIS. This indicates that the effluent is not suitable for irrigation, aquatic ecosystem and for other purposes. The average values and range for TA have been found to be 948. Pump and (81 811 20) pump- The average values and range are for HTH are pompom and (1226-7454) pump. HTH is well above the permissible limit of IBIS.

It has observed that high value of HTH Causes heart disease. Therefore the distillery effluent belongs to hard Water Category and hence needs treatment 10 . The average values and range for CIA- ions are 1574. 40 pump and (814. 6-2995. 8)pump and for ASS 2- are (656. 46) pump and 99. 842 1904. 86) pump. The high values of CLC- and ASS - is responsible for high hardness in distillery effluent. The average and range for IPPP- in distillery effluent is 14690. Pump and 992420158 pump. These values are above the maximum permissible limits of IBIS. High IPPP- contents are responsible for transaction of water body.

Therefore distillery effluent must be treated before discharging in to water bodies. The average and range of various metals for distillery effluent are An+ average = 572. 46 pump range - 396. 2-776. 60 pump K+ average = 820. 80 pump range = 590. 86-1006. 42 pump Ca+ average 504. 60 pump range 272-974 pump MGM+2 average 385. 74 pump range = 125. 8 - 12046 pump These results indicate that distillery effluent is highly polluted and adversely affects the surrounding ecosystem and must be treated before discharge. The average values and range for BODY are 9780. 24 pm and 5634. 4 to 14824. 24 pump and for COD are 14552. 60 and (8030. 64 28846. 46) pump The values for COD and BODY are found to be very high and well

above the limit prescribed by IBIS. These high values of BODY and COD indicate a heavy load of organic compounds in distillery effluent. The values of SARA, SSP, KERR and MR. were calculated in order to assess the suitability of distillery effluents for irrigation. The minimum, maximum and average values for these parameters are given in the Table 2 pointed out importance Of  $An^+$  concentration in assessing suitability of water for irrigation 1 1 .

According to him excess of  $An^+$  ions in water reacts with soil to reduce its permeability. High values of  $An^+$  are hazardous to the crops. Therefore SARA is used for assessing the quality of irrigation water. Irrigation water is classified by Richards based on the values of SARA given in Table II. Based upon above classification, the distillery effluent is considered to be fair for irrigation (SARA = 27) .