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UNTREATED EFFLUENT OF SUGAR MILL

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ABSTRACT:

The sugar industrysubsumes the production, processing and marketing of sugars. Globally, most sugar is extracted fromsugarcane. During the whole process of sugar formation huge amount of harmful chemicals are discharge into river and streams and pollute water. Sugar industry is a very important agro based industry in India and it discharge large amount of effluent into the water bodies to create high pollution load in them and thus alter the parameters of water which in turn harm river ecosystem. The sugar mills generate effluent which makes environmental problems related to water and land pollution.The waste water generated from sugar mills infiltrate into subsoil and leaches into ground water forming contaminated pool which disturb the ground water quality by changing its chemical composition properties and cause water pollution.Usually bagasse gets used to power boilers within the sugar industry and this process causes the emission of pollutants such as sulphurdioxide, carbon monoxide and nitrogenoxide. Other pollutants discharge from sugar mill is oil and greases, carbonate,bicarbonate, nitrite, phosphate etc.

Key words: sugar industry, river ecosystem, effluent, bagasse,water pollution, pollutants

INTRODUCTION:

We have vast areas like oceans,rivers, streams and lakes.Due to ever increasing population and intense desires to raise the living standards, we are exploiting our natural resources by our interference, negligence and pollutions. Water pollution is the contamination of water sources by substances which makes the water unstable for drinking, cooking cleaning, swimming and other activities. Pollutants include chemicals,trash, bacteria and parasites. All forms of pollution eventually make their way to water. Polluted water may causes typhoid, cholera, hepatitis and various other diseases. Destruction of ecosystem is again a result of polluted water. Ecosystem is

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extremely dynamic and responds to even small changes in the environment. Water pollution can cause an entire ecosystem to collapse if left unchecked.

Industries are one of the major sources for creating water pollution.The pollutants present in industrial water are numerous in number and highly diversified in nature depending on industrial processes and raw material used. The waste from the industry thus contains various substances, which may include the raw materials, intermediate products, co products,by products and processing chemicals.(WHO,1982)

Generally sugar mill produces about 250 tons of sugar every day. The mill opens only half of the year from November to May. Their effluent

Discharge into the river which entirely disturbs the normal parameters of water and thus disturbs the ecosystem.

Sugar factory generate effluent which makes environmental problems related to water and land pollution. The effluent if discharge directly without treatment into the water body, food chain of that river disturb as parameters of normal water shows some low high changes due to contamination. Effluent discharges from sugar mills constitute a number of chemical pollutants such as oil and grease,carbonate,bicarbonate,nitrite,phosphate, in addition to total suspended solids,dissolved solids,volatile solids and scopes of other toxicants. These pollutants could bring about changes in temperature,humidity,oxygen supply, pesticides, stress etc.Amounting to a partial or complete in the physical, chemical and physiological sphere of the biota.

Present study deals with the harmful chemicals present in untreated effluent of sugar mill and if discharge it without treatment into the river, how much pollution loads it creates andits impact on river ecosystem.

METHODOLOGY: Water after processing is collected from processing site sugar mill, Doiwala, at a regular interval of 10 days for a period of one month. This is untreated effluent and ready to send for the treatment in effluent treatment plant which is in working condition .This untreated effluent is filled in a plastic bottles.Temperature andcolor is noted down in the field.

With the help of laboratory of Soil and Water Conservation, Dehradun, some (which are possible their) of the parameters of untreated effluent were calculated which shows very alters results as mention in Table1.

Process description of sugar industry:

The various steps involved for the production of sugar are as follows:

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1. Procurement of sugar cane.

2. Milling of sugar cane

3. Juice preparation

4. Juice concentration

5. Syrupprocessing and crystallization

6. Sugar crystal separation, drying,packaging and molasses handling

7. Bagasse utilization

The sugar cane received from the fields contains about 70% moisture on an average .Majority of this water has to be discharged as factory waste water.The quantity of effluent also depends upon the size of sugar industry.

Centrifugation produces another type of waste called molasses and bagasse. Molasses is an important raw material for distilleries .Generated waste water from sugar industries shows high parameters.

Table1. Shows characteristics of waste water from a sugar plant:

Parameter	**Concentration**
BOD	1250mg/l
COD	2340mg/l
pH	4-6
Temperature	30-40^{0}C
Total suspended solids	655mg/l
Total dissolved solids	2000mg/l
Total volatile solids	13200mg/l
Oil n grease	55mg/l
Sulphates	500mg/l
Nitrogen	9mg/l
Phosphorus	66mg/l
Chlorides	62mg/l
calcium	180mg/l
Magnesium	76mg/l

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The observed parameters are from untreated effluent of sugar mill effluent,Doiwala, Dehradun. The parameters are quite high and are above the limits as directed by pollution control board (Table2)

TABLE 2.Shows the maximum values of parameters of effluent Recommended by Pollution Control Board and the value of water as control.

PARAMETERS	**WATER CONTROL** (mg/l)	**MAXIMUM RECOMMENDED VALUE**	**REERENCE**
TURBIDITY	0.010	-	-
APPEARANCE	CLEAR	-	-
COLOUR	COLOURLESS	-	-
TEMPERATURE	-	-	-
ODOR	UNPLEASENT	ODERLESS	ISI2490
pH	7	5.5-9	ISI:2296
EC	1.35	-	-
TS	1504	2700	-
TSS	138	600	ISI:3306
TDS	1365	2100	ISI:3307
BOD	10.0	30	ISI:2490
COD	20.0	250	ISI:2490
NITROGEN	0.04	-	-
PHOSPHATE	0.02	-	-
NITRATE	TRACES	-	-
CHLORIDES	55	600	ISI:2296
ALKALINITY	210	-	-
CALCIUM	65	600	ICMR1975
MAGNECIUM	44	-	-

The observed parameters in Table 1 are from untreated effluent of sugar mill, Doiwala, Dehradun. The parameters are quite high and are above the limits as directed by pollution control board (Table2)

If this concentration of effluent is discharged directly into river body, without proper effluent treatment, the normal parameters of water alters and thus result is disaster which may causes-

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1. Contamination of food chain
2. Lack of potable water
3. Spread of diseases
4. Eutrophication
5. Ruination of the ecosystem

RESULT: Sugar mill effluent before treatment confirmed that it is acidic in nature with molasses smell. All other important parameters like BOD, COD, DO, etc. are disturb and it also reduced to the decomposition of substances by microbes.Decomposition of organic waste matter produced various pollutants like sulphides, CO_2,CO,NO.Low pH makes it highly acidic which spoil the entire ecosystem.High temperature of effluent also plays a major role in aquatic environment and has lethal effects on the diversity of aquatic environment.

Burning sugarcane bagasse during harvesting season have many determinate impacts on the environment such as degradation of the air quality and the emissionsof harmful combustionproducts such as volatile organic carbons(VOC) and carbon monoxide(CO) .

Although the effluent from this sugar mill is not directly discharged into the nearby water body or landas is treated in ETP before its discharge.

CONCLUSION: The untreated effluent of sugar mills contains high parameters value like high BOD,COD, TDS, etc. and lower limits of DO, pH ,which are causes of degrading of water bodies. Hence these are unfit and must not be discharged into irrigation, river bodies or drainage system.

Untreated effluent discharging from sugar mills not only degrade surface water body, fertile soil but also polluted ground water. Hence it is suggested that effluent before discharge must be treated properly. The study observed that it is good that effluent in Doiwala sugarmill is properly treated before its discharge otherwise the surface water, ground water and soil water contaminatedthrough the discharge of sugar mills very badly and surely ruin the river ecosystem.

It is suggested that if the treated waste water of sugar factory will diluted with fresh water and then used for irrigation purposes may prove to be good results in agriculture.(National Environmental Quality Standards (NEQS))

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