

Sugarcane Industry Wastewater Containing Various Pollutants Characterization

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Abstract: *The industrial waste water is fully included with the poisonous materials and the heavy metals. Before treatment and its pretreatment it has various parameters which affects to waste water. Many separate procedures are accepted by humans for its treatment. In this we are going to decide the various physiochemical characteristics of sugarcane industry waste water. As i am doing all my experiments on the sugarcane factory at the someshwar in a taluka baramati, district Pune. I was collected sample there and then proceed further towards my experiment.*

Keywords: Complex, Effluents, physiochemical, pretreatment

1. Introduction

The waste water from the sugarcane industry includes various pollutants such as hazardous and Nonhazardous type Phosphates, Pottassium, Copper, Zinc, lead, iron, sulphate, magnesium, calcium, chlorides, Dissolved Solid, Total Dissolved Solid. As we know sugar is very important in our everyday life, because due to sugar we can fulfill with sweet test, it is very important factor in our diet, the dried bagasses after the sugarcane processing can be used as the burning material for the boiler and one of the important resources while manufacturing the sugar, for burning of the boiler. In from all world 86 nations using bagasses as a resource of energy creation. As consider about whole world two types of sugar are there one that prepared from the beet and other is prepared from the sugarcane. But as compared to the sugar prepared from the beet the sugar of sugarcane is very much popular. As the sugarcane industry has very big investment in it, it is also deals with the production of the Ethanol, Electricity. This is sector which can generate considerable income from this sources like Sugarcane production, ethanol production, electricity generation, wines production by the process of the fermentation. In the sector of the sugar, there are top five nations are there which are related to the production about 45 percentages totally into the world, which have sufficient number of industries that nations are India, china, brazil, Thailand, Australia. Some nations are producing sugar by the beet, some are producing sugar by the sugarcane, some are producing sugar by both sugarcane & beet instead of any individual. Hence it is very important to aware about the production of the sugar total in world to know the parent providers of the sugarcane to world.

Processing of the sugar during its all production:

In this we have to first took the sugarcane near to the sugarcane industry, and then crush it for taking out the juice of the sugarcane. After that we are proceeding towards the functions in a juice extraction as follows:

Milling: Milling means in this we have crushed the sugarcane in steel rollers then it wills 3-6 rollers are there

which are crushing the rollers

Diffusion: During the process the cane is shredded into pieces by the knife and by machines. Then into that diffuser machine the hot water is first introduced which will mixed up with the sucrose at the bottom of the crushed tank then that water will percolates through the bed of that tank then we will get the good appropriate thick juice of the cane which is useful for the production of the sugar.

Achieve Juice of sugarcane: In this case we can say that the sugarcane juice is achieved by the crushing of the sugarcane through the mechanical devices or through the manual operation performed on the wooden machine operated by the animal or by human. In this juice there is the range of the pH between 5-5.9, but to this condition we have to add lime of calcium hydroxide into it. Hence the pH of the juice is then dragged up to the 7 hence there is pH is maintained properly. In this way by adjusting the range of pH, there is decay of sucrose is totally prevented. then this juice is heated up to its boiling point temperature, then after that there is formation of crystals takes place this crystals are settle down to its base then remaining is sent to the next process of forming sucrose 60 percentage by its own weight .then this sugar crystals are introduced in a seed pan then the sucrose is concentrated around the suspended matter hence it is collected by the fluids and the size of the molecule will gets increased then We can use various techniques of the boiling of the syrup we can follow the different criteria's for the same.

The centrifuge is responsible for the separation of the sugar crystals; it has a capacity of the 2400 kg/cycle hence it is very important criterion regarding to the separate out of the dried sugar sample, then that remaining sample from the liquor is then treated again called as a mollescuite that is used for the making of the alcohol. In many sugar industries the cane juice is used for the many such other purposes such as for making the electricity for the purpose of use of industry departments or other areas near to the industry, which we can sell on the basis of the business .the steam generated can be used for the making of the electricity which electricity used

my company the steam generated is passed from the many such stations where that steam heat to some parts that heat also used carefully for getting the own aim of the planner. In this we can use the various terminologies regarding to the labors and to the automation .in this system we are responsible for the fast processing of the company. Automation in a sugar industry is developed only some decades ago. It is now become one of the important part of whole world sugarcane industries which is now become the backbone of the sugarcane industry sector. As we know the India is such type of country where the sugarcane industry sector is wholly carried over by the co-operative sector. Hence it is our responsibility to minimize to the corruption from the sugarcane industry. For the purpose we can carry over various schemes for the development of the nation through this cane industry sector, because India is one of the greatest country which will supply sugar to the 125 nations in the world, hence we must concentrate our minds on the development of the nation. Here we are going to consider the various wastes in the industrial waste water generated from the Someshwar sugarcane industry in a baramati taluka,district pune ,this industry get the award of the best sugarcane industry in a pune district ,under the leadership of the Chairman of the sugarcane industry Shri.Purushottam Ramraje Jagtap. Vice Chairman Shri. Siddhtrhbhau Natthuanna Gite. both persons leadership is too great due to their great leadership this industry is well known about its all industrial sector progress, and this industry generates 12 mega watts electricity everyday which is very much important thing about the village type areas industrial zone. Here we are going to consider the all physiological characteristics that are included into this investigation of the all parameters regarding to the waste water treatment in which the parameters included colour,odour, pH ,DO,BOD,COD,OIL & grease, Temperature, Electrical Conductivity, Total Dissolved Solids, all he included soils that may be called as Total Suspended solids, Chloride, Calcium, Magnecium, Sulphate, Pottassium, lead, Zinc, Phosphate.

Colour: Colour is the main characteristic of the wastewater quality, also as we are considering about the purity of the water. Hence this are supposed to light brown colour water having the waste water collection about less than the 6 Hours. If the water is light to medium grey then this is supposed to be collected about the some more period of collection. The blackening of the waste water is due to presence of the sulphides in waste water. It is generally ferrous sulphides it maybe Hydrogen Sulphides also. As we know the colour of the waste water is of various types in which that are the Dark Yellow, Dark Brownish, Blackish, Reddish yellow. As we are going to consider about the colour factor it is very much important phenomena as we consider about the food, and the reaching of the sun rays up to the water bottom. Because the lives of the micro organisms are too much dependent on the colour aspect, and this aspect is related to the oxygen contained into the water. Hence we must know the colour of the waste water is generally yellowish. This colour is after treatment is converted into the faint colour characteristics. This factor very much important about the utility of the water for the various purposes. this characteristic in considered by the each and every activities .colour is such type that must

not affects on reated water or for aquatic life of microorganisms.

pH:

It is very much important because on the basis of these phenomena, on the basis we are determining the concentration of negative charges of the hydrogen contained in the waste water. Here the range of the pH is generally ranges as the 0-14. means for the condition of the acidic the pH range is from the 0-6 and that of pH 7 is called a Neutral pH range value, when the pH of the waste water is from the 8-14 then it is called as alkaline waste water . As the waste water of the sugarcane industry the pH range is generally between the 3.3-5.5 as I am taking the test on the waste water of the someshwar sugarcane factory many times in a 4 days . Then this things are come to know to me that the content of the waste water is generally acidic character. and after the waste water treatment through the activated sludge process. I will check then is comes to about the 6.03-6.55 this range is low acidic consider to the pH range of the waste water.

Dissolved Oxygen

The dissolved oxygen means the oxygen which is in the dissolved form which is used by the micro-organisms for their various processes relating to the metabolism activities, which also depends on the Physiological and Biological Activities in the waste water. The water at a temperature of the 0°C has a dissolved oxygen content is near to 16 mg/lit and the dissolved oxygen at a temperature of 35°C is 8mg/lit hence we must consider the about the well percentage of the dissolved oxygen in a water.

I am making the experiment on the waste water of the Someshwar sugarcane factory, in this test I am observed that the Dissolved Oxygen of the untreated water is found in between the range of 0-1.5mg/lit. And after the treatment it is found to be 2.44mg/lit. Hence the range of the DO affects very much on the living organisms presents I the water. Then at finally I am come to know that there must be the appropriate percentage of the DO present in the water.

Due to the insufficiency of the DO content there may be various problems created during the life cycles running of the living organisms.

Chlorides:

Chlorides are for the most part present in common water. The nearness of chloride in common water is credited to disintegration of salt stores' release of effluents from substance

Businesses oil well operations, sewage releases start seepage, pollution from deny leachates, and ocean water interruption in beach front zone. In the present review, chlorides of untreated effluents were 205 mg/l and treated profluent demonstrated 170 mg/l. Matkar and Gangotri (2002) watched that the effluents from sugar industry have 450 what's more, 455 mg/l untreated profluent and the treated gushing was 156 and 162 mg/l in November and December, separately.

Biochemical oxygen request

Biochemical oxygen request is characterized as measure of

Oxygen required by microorganism while balancing out natural decomposable natural matter in waster high-impact Conditions. Organic oxygen request is an imperative corrected. Parameter that shows the size of water contaminated pollution, by the oxidizable existing matter and the oxygen used for oxidization of inorganic matter, for example, sulfides and ferrous Particles. In the process, the consumable matter on oxidation goes into biogeochemical cycle. It was found that the Natural oxygen request of untreated effluents BOD Was 970 mg/l and treated gushing indicated 300 mg/l, separately. BOD of sugar plant gives out to be 635–950 mg/l Extend. He watched the estimation of BOD for the sugar process emanating and it differed from 950 to 635 mg/l with streaming remove.

Concoction oxygen request:

The COD test decides the oxygen required for synthetic Oxidation of natural matter with the assistance of solid concoction oxidant. The COD is a test which also can decide the pollution of household and mechanical waste. The waste is measured regarding nature of oxygen required for the Oxidation of natural matter to create carbon dioxide and Water. The conjugation of BOD test with COD test is Accommodating in sign of poisonous conditions and the nearness of organic resistance. From the underlying examination, it was watched that the COD of untreated effluents was 3,682 mg/l and can be diminished up to 300 mg/l, individually appeared COD 22,000 mg/l on espresso handling of the industry waste. Significance of natural Matter in the nature of blossom firming cyan bacteria has Been accounted for by numerous laborers. Samuel and Muthukkaruppan (2011) watched that the gushing of sugar industry squander water stacked 3,146 mg/l which is not reasonable for seed development.

Oil:

The centralization of total oil and oil (OG) is an Good parameter for water quality and wellbeing. From the different poisonous materials oil is also one of danger contaminant in its some forms contaminations to evacuate. Assurance of oil and oil fixations in profluent does not decide the nearness of specific substances, yet collecting of substances that can be loosened from a specimen utilizing a specific gushing. Oil, oil, fats and waxes are broken down in reasonable dissolvable and isolated from the fluid stage. The Dissolvable layer does then not exist and the matter is weighed as oil and oil. Oil pollutants are found 16 mg/lit. in industrial treatment procedures and after that activities is found as . Someshawar factory said that the streams of the polluted water with oil as 14mg/lit in industry there. Administration (minimization of misfortunes) the chose procedure/unit is right off the bat partitioned into sinks and sources' streams. Sinks streams are sorted as gulf floods of the chose unit/handle and the outlet streams are considered as sources. In any case, freshwater and waste water are likewise put under sources classification as a portion of the squander streams can't be utilized/reused as sources to the unit During the creation of sugar activities done at work place care as following: imbibitions, prepare water utilize, lime make up water, flocculants make up water, channel wash, container house prerequisites and administration water necessities. The utilization of outer supplies ought to be kept to least, since they expand the

Amount to be arranged of at last. It is workable for a factory to exist without an outside supply, if water circuits in the plant are precisely over saw.

Magnesium in Sugarcane Waste:

It is the very important pollutant of the waste water it is found to be in the range of about 480mg/lit. In a treated liquids that appropriate limit is 220mg/lit.. Hence the treatment before it is necessary. Magnesium happens usually in the minerals magnetite and dolomite. The regular fluid species is Mg²⁺ The carbonate harmony responses from magnesium are more convoluted than for calcium and conditions for direct precipitation of dolomite in characteristic waters are not normal. Magnesium also causes in some amount hardness of water hence it is important to measure the hardness of waste water for the magnesium detection.. Concoction softening, turn around osmosis, particle trade decreases magnesium and related hardness to satisfactory levels. Magnesium is a fundamental component in chlorophyll and in red platelets. A few salts of magnesium are lethal by ingestion or inward breath. Focuses more prominent than 125 mg/L likewise can have a cathartic and diuretic impact.

Table 1: Wastewater Possessing limit & Percentage of Each Parameter of sugar industry waste water

Sr. no	Parameters	Parameter
1	Odour	Offensive Fishery
2	Colour	Dark Brown with Yellow
3	Suspended Solids	820 mg/lit.
4	Total Dissolved Solids	1600 mg/lit.
5	DO	0.9
6	Oil	18 mg/lit.
7	Temperature	46°C
8	COD	3770 mg/lit.
9	BOD	1010 mg/lit.
10	Magnesium	270 mg/lit.
11	Phosphates	425 mg/lit.
12	Sulphate compounds	419 mg/lit

Sulphate compounds in sugarcane waste:

Sulphate compounds in sugarcane waste is having different atomic character particles, which happened in normal

Water and additionally it has been utilized as a part of various industries. Emanating from specific businesses likewise might be real sources of sulfate to the getting water. Sulfur itself has never been a constraining component in amphibian frameworks. The typical levels of sulfates are more than satisfactory to address plant issues; scent conditions are effectively more prominent when water is over-burden with natural waste to the point that oxygen is expelled, so that SO₄ as electron acceptor is regularly utilized for the breakdown of natural matter and creates H₂S and spoiled egg smell (Welch 1998). In the present review, sulfate of untreated effluents was 419 mg/l and treated profluent 220 mg/l. Manual (2002) watched sulfate in sugar industry profluent that was 550 and 555 mg/l in November month found value 419 mg/l in November and December, individually. Watched that sulfate run in the vicinity of 200

and 93 mg/l as indicated by streaming separation from profluent releasing unit to 5 km long. This demonstrates as the separation increments from the outlet, the estimation of sulfate reductions.

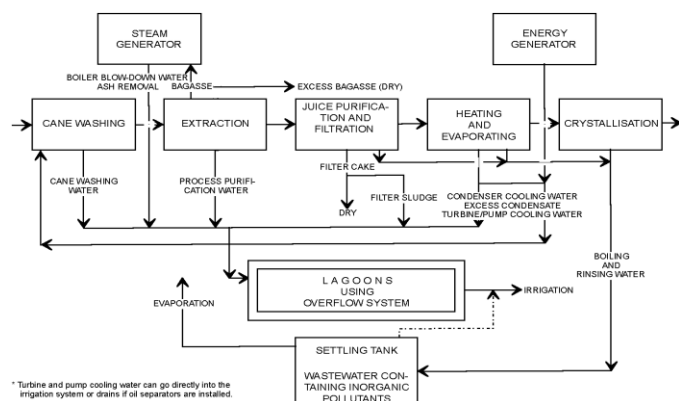


Figure 1

2. Conclusion

As we are discussing in this article the wastewater different pollutants containing in the used water, which contains large amount of waste oil and grease. It possesses various types of pollutants which can make bad Negative effect on the relating environment to the sugarcane factory ,which pollutes the soil in that area, Clear water sources , also the persons which are working in the area of the sugarcane industry inside to factory and to area surrounding vicinity of the factory . we can give the treated water to the trees growing around the area of the sugarcane factory and we can artificially provide the system that can increase the ground water level of the water around the factory area. and hence this water can percolate safely into the wells ,take to side area of the factory or can be useful to the farmers nearby to that area.

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