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Characteristic study in optimization of Biomethanation process for high TDS spent wash from Distilleries

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ABSTRACT

Acidic in nature, dark brown colored rich source of salts, a highly thick and viscous by product of the sugar industry is known as Molasses. This molasses also contains sugar which could not be crystallized. It is one of the most strongest organic industrial waste and even complex troublesome having extremely very high Chemical Oxygen Demand and Biological Oxygen Demand values. Due to high concentration of organic contents in distillery spent wash which acts as potential source of renewable energy. In a developing country like India distilleries have become a major source of pollution as 88% of its raw materials are converted in to waste and discharged in to the distillery for every liter of ethanol produced.

Keywords: Total dissolved solids, Distillery Spent Wash, Organic Effluent

1. INTRODUCTION

Managing wastes is the world's one of the most critical and important environmental problems. Sugar industries produce variety of waste water pollutants, those are costly and difficulty to treat. The characteristics and levels of pollutants vary significantly from one industry to another.

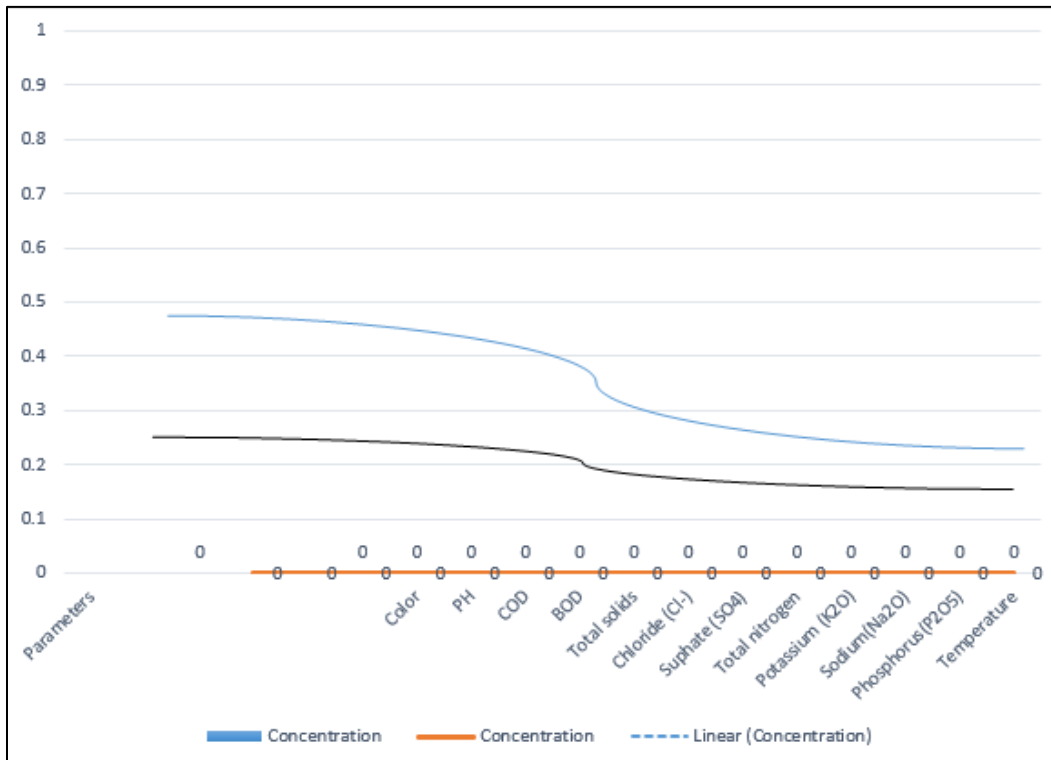
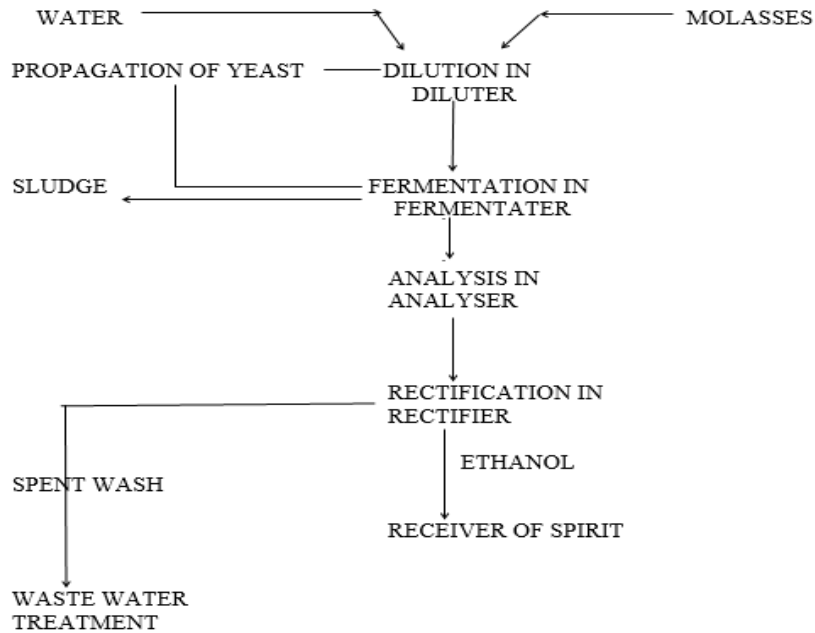
Nearly 330 distilleries in India which generate approximately more than 4 billion liters of alcohol (rectified spirit) with around 1.5 billion liters of power alcohol. Along with all their nearly 50-52 billion liters of waste water per year. The huge number of distillery spent wash has the potential to produce 1500 million cubic meters of biogas. the post methanated spent wash if used carefully for agricultural and irrigation purposes which produce more than 90000 to 92000 tonne of Biomass annually.

60% of methane gas normally present in biogas with minimum air pollution potential which is a well-recognized fuel gas. if this source of energy is tapped. It will fetch additional energy units worth 6 trillion kilo calories annually. Beyond the post methanation effluent (PME) can provide 245000 tonnes of potassium, 12500 tonnes of nitrogen and 2100 tonnes of phosphorous annually.

2. METHODOLOGY

Generally, methane (CH₄) and carbon dioxide (CO₂) are produced from anaerobic digested biomethanated spent wash along with the traces of other gases like hydrogen sulphide (H₂S) with hydrogen (H₂). The same procedure involves several groups of microorganisms or yeast propagation that makes the process complex and sensitive. So in the same method there is a good provision to study the characteristics and concentration of spent wash.

The waste water collected from Samson Distilleries Duggavathi in that optimized characteristic are obtained as follows in the table: (by UASB Method by using two different reactors)



Parameters	Concentration	
	Spent wash generated from distillery 1:4 liters(collected from Samson distilleries duggavathi)	Biomethanation of collected sample (after 5 days)
	jaggery	jaggery
Color	Dark brown	Dark brown
pH	4.7-5.2	5.3-6.5
COD	115000mg/l	87000mg/l
BOD	86000mg/l	58000mg/l
Total solids	135000mg/l	103000mg/l
Chloride (Cl ⁻)	9900mg/l	6500mg/l
Suphate (SO ₄)	6240mg/l	4250mg/l
Total nitrogen	8110mg/l	5120mg/l
Potassium (K ₂ O)	19840mg/l	-----
Sodium(Na ₂ O)	2000mg/l	1700mg/l
Phosphorus(P ₂ O ₅)	1800mg/l	-----
Temperature	60-70 ⁰ c	38-45 ⁰ c

3. RESULT

With respect to the obtained data after biomethanation all the results leads to reduce the values as dilution has updated positively (optimized) in a stable and automatic process with low operated costs can be used for agricultural purposes without harming to the environment and aid to zero pollution. So the methods are dual beneficial to the environment and also to the energy production.

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