May- June 2020
ISSN: 0193-4120 Page No. 6391 - 6394

Experimental Investigation On Sugar Industry Effluent By Using Upflow Anaerobic Sludge Blanket Reactor

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Abstract:
Now a days, the environment is suffering due to energy (renewable and non-renewable). Due to this condition we had choose this project, in our project we took sugar industry effluent, and characterized the effluent. The effluent had more amount of organic compound as well as heavy metals, so that was suitable for producing the biogas. Due to the organic compound digestion process the biogas was produced. The organic compound was largely digested by anaerobic process. Anaerobic process means with out oxygens the bacteria was digested by bacteria's. for anaerobic process we take UASB (Up flow anaerobic sludge blanket reactor) . The reactor height is 1000mm and it diameter is 12.5mm. The reactor that had four stages, they are respectively hydrolysis, acidogenesis, acetogenesis and methanogensis. In that fourth stage the bio gas was produced. During the process of UASB Reactor the effluent characteristics especially the pH was maintained. So to maintain the pH value we add some coagulants. We investigate the sugar industry waste water by adding two type of coagulants they are namely chemical and natural coagulants. At last we got the result, when compare to chemical coagulants the natural coagulants produce more amount of bio gas.

Keywords*: environment, acidogenesis, UASB (Up flow anaerobic sludge blanket reactor)*

Introduction:

Water is perhaps the world's most important natural commodities. It is regrettably increasingly polluted and immediate steps are required to prevent harm. Waste water is discharged immediately to lakes and waterways without filtering in certain nations, so it is desperately important to employ biologically and economically viable waste water disposal forms.The UASB Reactor is considered to be one of the productive anaerobic systems able to shape auto immobilisation intense aggregates and hence require high reactor efficiency. The main application is for handling industrial wastewater in large amounts, which may also also be used for handling urban wastewater that has less emissions. It has become more and more common because of its simplistic nature, quick construct and maintenance, low cost of service and capacity to withstand variations in pH, temperature and prominent substrata concentration.

2. Materials and method

2.1 coagulants used

There are two type of coagulants used namely, chemical and natural coagulants.

2.1.1 Chemical Coagulants

Sodium Bi carbonate, It is a solvent for water treatment that is used to smooth water by eliminating the impurity of calcium and magnesium. **Ammonium chloride** is mainly used in any type of liquor ice as a pesticide and fragrance. Even in oral

May- June 2020
ISSN: 0193-4120 Page No. 6391 - 6394

acid preparation procedures for lateral distal renal tubular acidosis, a systemic acidified substance used to treat extreme physiological alkalosis**. Magnesium sulphate,** popular in the catalysis used as a dryer because of its water sensitivity and consistency with most organic materials. **The application of potassium chloride decreases sodium amount (Na) in water.**

2.1.2 Reactor setup

The diagram 1 indicates the UASB and was coated well with Poly-vinyl chloride. The effluent that was applied into the reactor by using pump, at the bottom of the UASB Reactor. the reactor inlet was fixed at bottom of the reactor and the outlet was fixed at top of the reactor. After applied the effluent into the reactor the reactor was maintained by coagulants. The natural and chemical coagulants are separately investigated.

Fig-1: UASB Reactor

2.1.3 Natural coagulants

Cheese, Bio gas production from cheese as an energetically **rice product that can contain more than 50 g/l**. one lactose was investigated.**Cow dung**, Cow dung yield the highest bio gas with **Methane content of 67.9%. Poultry waste**, One of the **important biomass**. Which was used in methane production.

2.2 Methodology

Fig-2: Methodology

3. Result and discussion

3.1.1 General

From that experiment the heavy metals, high rate of biologically oxygen demand and chemically oxygen was highly reduced.

3.1.2 Gas collection

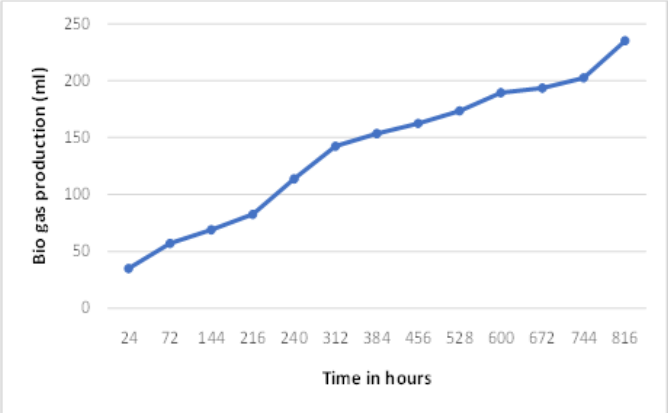
Gas was collected at the top of the reactor. That was collected by using mat rid bottle with pinch of sodium chloride. And then the gas was analysed by using water displacement method.

S.NO	parameters	Obtained value	Standard value
1	pH	7.12	7.5-9
2	COD	1512 mg/l	1000-4340mg/l
3	BOD	727.82 mg/l	350-2750mg/l
4	TS	1956 mg/l	960-3270mg/l
5	TDS	1256 mg/l	400-1650mg/l
6	DSS	563 mg/l	560-1620mg/l

May- June 2020
ISSN: 0193-4120 Page No. 6391 - 6394

7	Color	Dark brown	Dark brown
8	Sulphate	172 mg/l	160-639mg/l
9	chloride	427 mg/l	349-649mg/l
10	DO	936 mg/l	650-950mg/l

Table-1: Characteristics of sugar factory sludge in natural coagulants

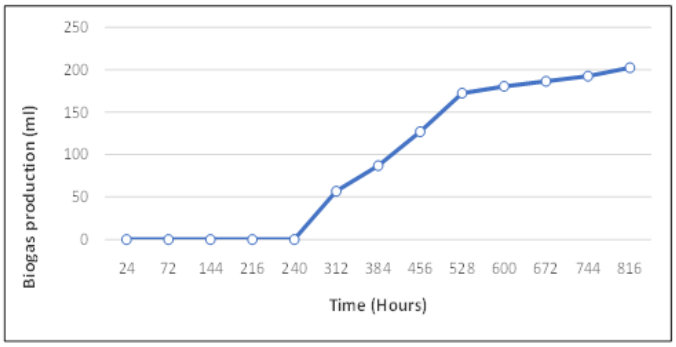


Graph-1: Table-1: Biogas production of sugar factory sludge in natural coagulants

Table-1: Characteristics of sugar mill effluent in chemical coagulants

S.NO	**parameters**	**Obtained value**	**Standard value**
1	pH	7.12	7.5-9
2	COD	1562mg/l	1000-4340mg/l
3	BOD	735.36mg/l	350-2750mg/l
4	TS	2010 mg/l	960-3270mg/l
5	TDS	1360mg/l	400-1650mg/l
6	TSS	650mg/l	560-1620mg/l
7	Color	Dark brown	Dark brown
8	Sulphate	182mg/l	160-639mg/l
9	chloride	432mg/l	349-649mg/l
10	DO	1025mg/l	650-950mg/l

May- June 2020
ISSN: 0193-4120 Page No. 6391 - 6394



Graph-1: Biogas production of sugar mill effluent in natural coagulants

CONCLUSION

The sugar industry waste water was investigated by using upflow anaerobic sludge blanket reactor. The biogas was produced in both coagulants effluent. But when compare to the chemical coagulants effluent the natural coagulants effluent was more amount of biogas was produced. The chemical coagulant produce the large amount of biogas yield in 816 hours. And the natural coagulants produced in 744 hour.

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