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An Assessment Paper on Parameters Guidance Value of Biogas Creation

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Abstract
Biogas/ Gobargas is of more important in this days energy resources. It is very much important fuel in low cost with good efficiency. Fossil fuels are going to end in upcoming 50 years. So we have to make good quality of alternative fuel like biogas. Production of biogas/ gobargas depend on using of waste and organic feedstock matter, that provides an excellent solution for organic waste management. There are different parameters those disturb the yield of biogas by anaerobic digestion. .Biogas is a mixing of different gases that is an outcome of anaerobic (absence of air) digestion. It consists mainly methane-(CH4) and carbon dioxide-(CO2) which are the main greenhouse-gases and other different impurities. The substrate for anaerobic digester is a different kind of organic waste matter means it decreases load of disposal of organic load of wastes due to the uncontrolled open dumping of organic discarded waste. There are e biogas output rate including the usage of feedstock temperature, hydraulic retention time, C/N ratio, pH value, mixing, feed stock loading rate, agitation, etc. Currently Biogas is solving problems of fuel in rural areas to some extent.

Keywords
Organic farming, Thermophilic, dioxide-(CO2, pH Value, Acetogenesis, Biogas

1. Introduction
Fulfilling the demand of energy there are many resources but some fuels like fossil fuels petrol, diesel, etc. are depleting day by day and also these fuels are harmful to the environment so to save our environment and for the replacement of these fuels Biogas is the best option. Biogas can be produced from various wastes like animal manure and slurry, sewage, sludge, municipal solid waste, and food waste so it can reduce waste and also some fertilizers suitable for the agricultural purpose are also produced during biogas production process. Anaerobic digestion is the process to produce biogas from biomass. Biogas composition is mainly of methane (CH4) 65% by volume . This process includes four phases to produce biogas Hydrolysis, Acidification, Acetogenesis, and Methanogenesis. dioxide-(CO2 is the process in which disintegration of water into H+ and OH-ions occurs. By hydrolysis reaction breakdown of various organic polymers like protein, fats and carbohydrates occur. Acid ogenesisis the next step of anaerobic digestion which includes the breakdown of organic matter by acidogenic bacteria which produce H2,CO2, H2S, Volatile fatty acids and other products. In the third step which is acetogenesis, acetategenerates which is a derivative of acetic acid. In the final step, methane is produced from the productsof the last step. There are various factors which affect the digestion process and these factors will also affect the biogas production, so biogas production depends on various factors like temperature, pH value, C/N ratio, HRT. In this review paper, it is shown that how this parameters will affect the biogas production. primitive production attempts made with local facilities. Biogas production is anvery important biological process.For this reason, it is necessary toensure that all conditions are fulfilled to get high quality of biogas.

2. Temperature
There are Varying temperature ranges at which different type of bacteria work such as Cryophilic (ranges from 12 -25), Mesophilic ranges from (25-40) and Thermophilic (ranges from 40-65). It is very much important fuel in low cost with good efficiency. Fossil fuels are going to end in upcoming 50 years. So we have to make good quality of alternative fuel like biogas. Production of biogas/ gobargas depend on using of waste and organic feedstock matter, that provides an excellent solution for organic waste management. There are different parameters those disturb the yield of biogas by anaerobic digestion. .Biogas is a mixing of different gases that is an outcome of anaerobic (absence of air) digestion. It consists mainly methane-(CH4) and carbon dioxide-(CO2) which are the main greenhouse-gases and other different impurities. The substrate for anaerobic digester is a different kind of organic waste matter means it decreases load

of disposal of organic load of wastes due to the uncontrolled open dumping of organic discarded waste. There are e biogas output rate including the usage of feedstock temperature, hydraulic retention time, C/N ratio, pH value, mixing, feed stock loading rate, agitation, etc.Rise in temperature aids increased gas production but results in lesser methane content and increased percentage of CO2leading to lower heating value of biogas. Hence, the optimum temperature was found to be 32°-35°C for efficient and continuous biogas production.

3. Effect of Carbon and Nitrogen Ratio Biogas Production

C/N ratio plays an important role to determine the suitability of organic matter (OM) for anaerobic digestion. High C/N ratio indicates low nitrogen content for microbial growth and as a result methanogens uptake the nitrogen for protein production thereby leading to carbon wastage which ultimately leads low biogas yield.Carbon and nitrogen is nutrient for microorganism they can grow due to Carbon and Nitrogen . It has been found in many studies that during digestion bacteria use carbon 25-30 times faster than nitrogen . Thus to complete this requirement microbes require 20-30:1proportion of carbon to nitrogen.

4. pH Value

pH role in the operation as the pH changes at different stages of the anaerobic digestion. pH and temperature are interdependent. Biogas production in the anaerobic environment is the optimumpH range of 6.5-7.5. It causes toxic effects on methane bacteria when this value falls below 6.2. The equilibrium profile reached the plant. The pH of the fermentation system varies depending on the fatty acids produced, the bicarbonate alkalinity and the carbon dioxide. The gas production efficiency is considerably adversely affected when the pH value down below 5.0. In general, the pH level of the plant is not used to determine the organic acid biogas potential which emitted as the results of buffering effect between carbondioxide-bicarbonate (CO_2-HCO_3) andammonia-ammonium (NH_3-NH_4).

5. Influence of Hydraulic Retention Time

It is the time for which the biodegradable matter remains inside the reactor. HRT is influenced by the temperature inside the digester, the type of the feedstock and the technologies applied. The HRT in case of mesophilic digester is 10-40 days and thermophilic is of 14 days. Shorter Hydraulic Retention time means less active bacteria and larger HRT needs larger digester which means more cost and low efficiency. Types of bacteria's or micro-organisms and temperature affect the HRT. Shorter HRT in thermophilic temperature system while greater HRT in mesophilic temperature system. At high temperature, reaction occurs fast and so the degradation will also be faster and HRT will be lesser.

Feed stock and its loading rate Feedstock is organic waste matter. Feed stock loading rate is defined as the amount of raw materials fed per day per unit volume of digester loading. Feed stock loading rate is a kind of food for micro-organism when they break the bond of organic waste, produce gas (methane and carbon dioxide mainly) so more organic loading rate produce more gases. It is directly proportional to the amount of volatile solids to be loaded in the digester which also influences the biogas yield. Some studies shows in the event that the digester is overloaded then acid will accumulate and methane production will be inhibited.

Higher level of dry solids especially lingo cellulose content affect the hydrolysis process .Total solids concentration is a measurement that includes the combination of total dissolved solids and total suspended solids. The reactor with 10% of total solid concentration had greater biogas production as compared with other reactors. Baserja reported that the biogas production increased to 0.46 m3/ (m3 day) at 37°C and 0.68 m3/ (m3 day) at 55°C respectively. It was observed that when solid content decreases below 6% system becomes unstable whereas above 10% total solid content the digester becomes overloaded hindering its performance. The size of the particle influences the overall fermentation of the organic matter in the digester Smaller particle size enhances greater adsorption on the substrate resulting in increase in the microbial activity leading to greater biogas yield.

Organic matter agitation Agitation of the organic matter helps to mix the organic feedstock without settling down and forming a scum in the digester. Slow mixing of the substrate was found to improve the biogas yield [8. The digester 30 rpm speed gave highest amount of biogas (i.e. 6.285 dm3/gm) having 58% CH_4content and followed by 50, 60 rpm having biogas yield of 5.720, 5.438 dm3/gm and CH_4content of 57.1%,55%, 50% and 48% respectively [9]. Agitation is a technique in which stirring of feedstock with different mixing ways increase contact between microorganism and substrate which result in improved digestion process.

6. Conclusion

The efficiency of biogas production is dependent on the combination of all the parameters like pH, temperature, C/N ratio, solid concentration, feedstock, hydraulic retention time, agitation that are discussed in details in this review According to all the parameters that are mentioned the suitable condition for the production of biogas can be the temperature for the biogas production ranges from the 32 to 35°C. Carbon to Nitrogen Ratio for the generation of the biogas is 20-30. pH for the suitable anaerobic digestion of the Biogas is 6-7. It is very much important fuel in low cost with good efficiency. Fossil fuels are going to end in upcoming 50 years. So we have to make good quality of alternative fuel like biogas. Production of biogas/ gobargas depend on using of waste and organic feedstock matter, that provides an excellent solution for organic waste management. There are different parameters those disturb the yield of biogas by anaerobic digestion. .Biogas is a mixing of different gases that is an outcome of anaerobic (absence of air)

digestion. It consists mainly methane-(CH_4) and carbon dioxide-(CO_2) which are the main greenhouse-gases and other different impurities. The substrate for anaerobic digester is a different kind of organic waste matter means it decreases load of disposal of organic load of wastes due to the uncontrolled open dumping of organic discarded waste. There are e biogas output rate including the usage of feedstock temperature, hydraulic retention time, C/N ratio, pH value, mixing, feed stock loading rate, agitation, etc. Total solid concentration required ranges from 8%-10%. Hydraulic Retention Time should be higher for more micro-organisms to develop in Biomass. Slurry agitation rate in digester should be 30 –40 rpm. We can solve fuel problems in country to some extent as well as the by product slurry as a bio fertilizer. The organic waste are converted into Biogas and fertilizer by applying proper condition of allparameters.

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