1	**Title of the project:** STUDY OF DESIGN AND FABRICATION OF BATCH FLOW BIODIGESTER FOR KITCHEN WASTE
2	**Name of the College and Department:** KVG COLLEGE OF ENGINEERING SULLIA DEPARTMENT OF MECHANICAL ENGINEERING
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4	**Keywords:** Batch flow biodigester, Retention period, Effective volume, Inoculation.
5	**Introduction:** Bio methanization is process is time consuming there by calling for bigger digestor with higher retention time. While designing the goal is always to increase the gas yield, to reduce the retention time. Conventional digestors calls for higher retention period, it is observed that the output slurry is not completely digested. Batch flow digestor is a forethought to reduce the retention period there by the volume and hence cost. Several digestor designs are developed across the world to increase the efficiency by the process improvement. Batch flow is a technique tried for increasing the gas yield at a lesser time. Batch flow digestor is having number of sequential chambers with feed flowing sequentially. This process helps in building up of bacteria colony suitable for an action specifically in each chamber.
6	**Objectives:** • Study of optimization of bio digester for kitchen waste feed using advanced batch flow type bio reactor. • The aim is to generate gas at a faster rate by optimized bio digester and thereby reducing the volume and hence the cost without affecting performance/yield. • Here anticipating a reduction of process time by about 5-7 days. • The plan is to use kitchen waste generated in the engineering hostel and use the gas produced there itself.
7	**Methodology:** We have chosen Materials 16-gauge CR (Cold Rolled) sheet with post welding noncorrosive epoxy coating (primer and paint) both internally and externally. Checked for leakage. Hood (gas holder) is bolted on top of the digestor tank with bolts and nuts after providing leak proof silicone sealant. At the centre of the hood (1.5 ft height) gas outlet pipe (3/4 inch) with gas regulating valve.

The inlet and outlet pipes (2 inch) are focusing centre of the respective chambers. Internal partition (4 chambers) is provided using arc welding (1.5+1+1+0.5 ft) [Ref. Photo below]. At the external edges L-angle supports (1*1*1/4 inch) is welded for the digestor. The combined internal volume of approximately 1100 litres is achieved.

A motorised pulveriser is attached at the inlet. The hopper of the pulveriser is made by welding (CR sheet). The blades provided internally which is connected using reduction chain sprocket arrangement to a 1HP electric motor beneath to facilitate feeding of kitchen/vegetable waste.

The digestor is tested for leakage by filling water. Compressed air is pumped to test breathing. The digestor is placed in a platform at the final location for feeding. For 200Kg cow dung 400 litres of water is fed for inoculation. Daily outing of the gas is allowed once, looking for methanization taking place.

	
8	**Results and Conclusions:** The digestor is inoculated, waiting for indication of methanization. Expected in couple of weeks. For result regular feeding will commence there after and it will take about 1.5 month for stabilization with regular consistent feeding.
9	**Scope for future work:** • For higher capacity batch flow digestors an internal agitator to break scum layer can be introduced to increase the gas release. Provision for maintaining internal temperature stability will go a long way in enhancing gas production. • Advanced engineering materials having higher anti corrosive property, thermal insulation can be used for construction (Steel reinforced with F. R. P. or glass) will increase the life and gas yield because of the thermal stability. • Hydrogen is much sought after fuel of future. Hydrogen can be used for both internal combustion as well as electric generation using fuel cell. Methane and moisture in the raw biogas are a highly useful gas to produce hydrogen (Methane has 4 hydrogen molecules whereas water only 2). It is already used commercially elsewhere in the name of sin gas. Batch flow digestor being advanced reactor type organic matters can be non-useful organic matter can be commercially exploited in a huge way.