

Biogas production from industrial waste



There are several biogas production technologies being used in agricultural industry and industrial plants that generate various benefits.

At present, systems that are being used include:

1 Up-Flow Anaerobic Sludge Blanket (UASB)

Under this system, waste water will be pumped into the bottom of two-storey tank, comprising sludge bed, consisting 2-5mm granular bacteria, and the sludge blanket. The upper-end of the UASB digester will install Gas Solid Separator to separate gas and prevent bacteria sludge from flowing along with waste water.



Figure 1 Up-Flow Anaerobic Sludge Blanket (UASB) system

2. Anaerobic Fixed Film (AFF) system

This system uses fermentation tank that provides biological firm as an intermediary to fix bacteria on, which could reduce losses of bacteria from water treatment system and make them resilient in case of change in conditions of water waste inflows or excessive organic density.



Figure 2 Anaerobic Fixed Film (AFF) system

3. Completely Stirred Tank Reactor (CSTR) system

This technique includes a mixing system, which may stir back biogas generated within the system or use stirring machine to ensure high digestion efficiency and able to cope with high addition of organic substances while reducing time to hold up waste water (HRT) within the digester.



Figure 3 Completely Stirred Tank Reactor (CSTR) system

4. Anaerobic Baffle Reactor (ABR) system

This system is a long digester with vertical bars installed to direct flows of water with upflow speed of around 0.2-0.4 meter/hour. This system can be used with waste water that contains high mixture. However, its sizable and requires large space.



Figure 4 Anaerobic Baffle Reactor (ABR) system

5. Modified Covered Lagoon (MCL) system

This anaerobic system is in the rectangular shape, covered by High Density Polyethylene (HDPE) plastic sheet or PVC and use as container for biogas generated. The sheets may cover the whole lagoon or only parts generating methane. The system also increase contact area of bacteria sludge with waste water and develop a system to pull sludge within pipes.

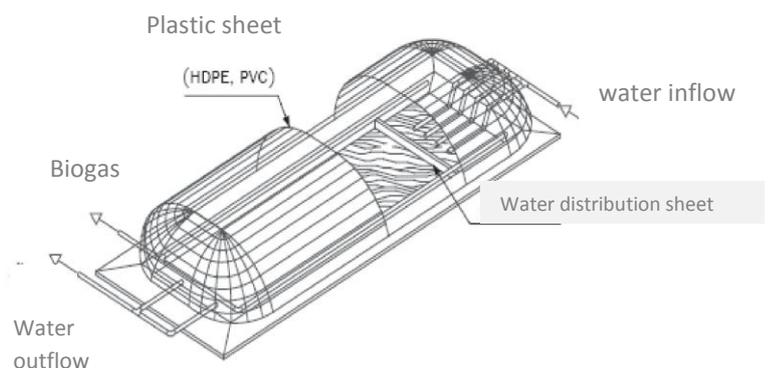


Figure 5 Modified Covered Lagoon (MCL) system

The biogas production technology has been applied in many industries. Frozen food, canned food, fruit juice producers usually use UASB, Covered Lagoon, and anaerobic filter system while cassava flour plants usually use UASB, High Suspension Solids-Up-Flow Anaerobic Sludge

Blanket (H-UASB), Anaerobic Baffled Reactor (ABR), Covered Lagoon, Fixed Film, and anaerobic filter. Crude palm oil plant usually use Completely Stirred Tank Reactor (CSTR) or Modified Covered Lagoon (MCL) while slaughter houses usually use plug flow digester, and UASB. Ethanol plants usually use Modified Covered Lagoon (MCL) and UASB.