

ECHO West Africa Forum

BIOGAS PRESENTATION

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Introduction

When the organic matter decomposes in the absence of oxygen , it produces gas called biogas . This gas is a mixture of methane (CH₄) and carbon dioxide (CO₂) with small amounts of nitrogen , hydrogen, carbon monoxide and other compounds. Biogas has multiple uses . To produce and capture the biogas is used a device called a bio digester. There are many models of bio methane digester , which range from the most complex to the simplest , from the largest to smallest. After giving basic information on biogas , this presentation will focus firstly on the two main types of bio digesters : the continuous feed and the fed-batch ; and secondly on the simple, locally available materials to make oneself its own biogas.

I. Basic information about biogas



Definition and advantages of biogas

● Definition

Biogas is a flammable gas produced by microorganisms when organic materials are fermented in a certain range of temperatures, moisture contents, and acidities, under airtight conditions.

The chief component of biogas is methane. And this mixture of gases is combustible if the methane content is greater than 50%.

○Advantages of biogas

The development of biogas is an important route to the solution of fuel problem in the countryside, and therefore of concern to the entire rural population.

Cooking with biogas is hygienic, smokeless and far more convenient and beneficial than using solid fuels.

The development of biogas is an important way to stimulate agricultural production.

Everywhere, in rural or town area, the development of biogas is also an effective way to deal with excreta and improve the hygiene and standard of health in the living environment.

❖ Usages of biogas

One cubic meter of biogas:

- Can cook three meals for a family of five or six persons.
- Can keep one biogas lamp of a luminosity equivalent to a 60 watt electric light burning for six to seven hours.
- Can keep a one horse-power motor for two hours.
- Can generate 1.25 kW electricity

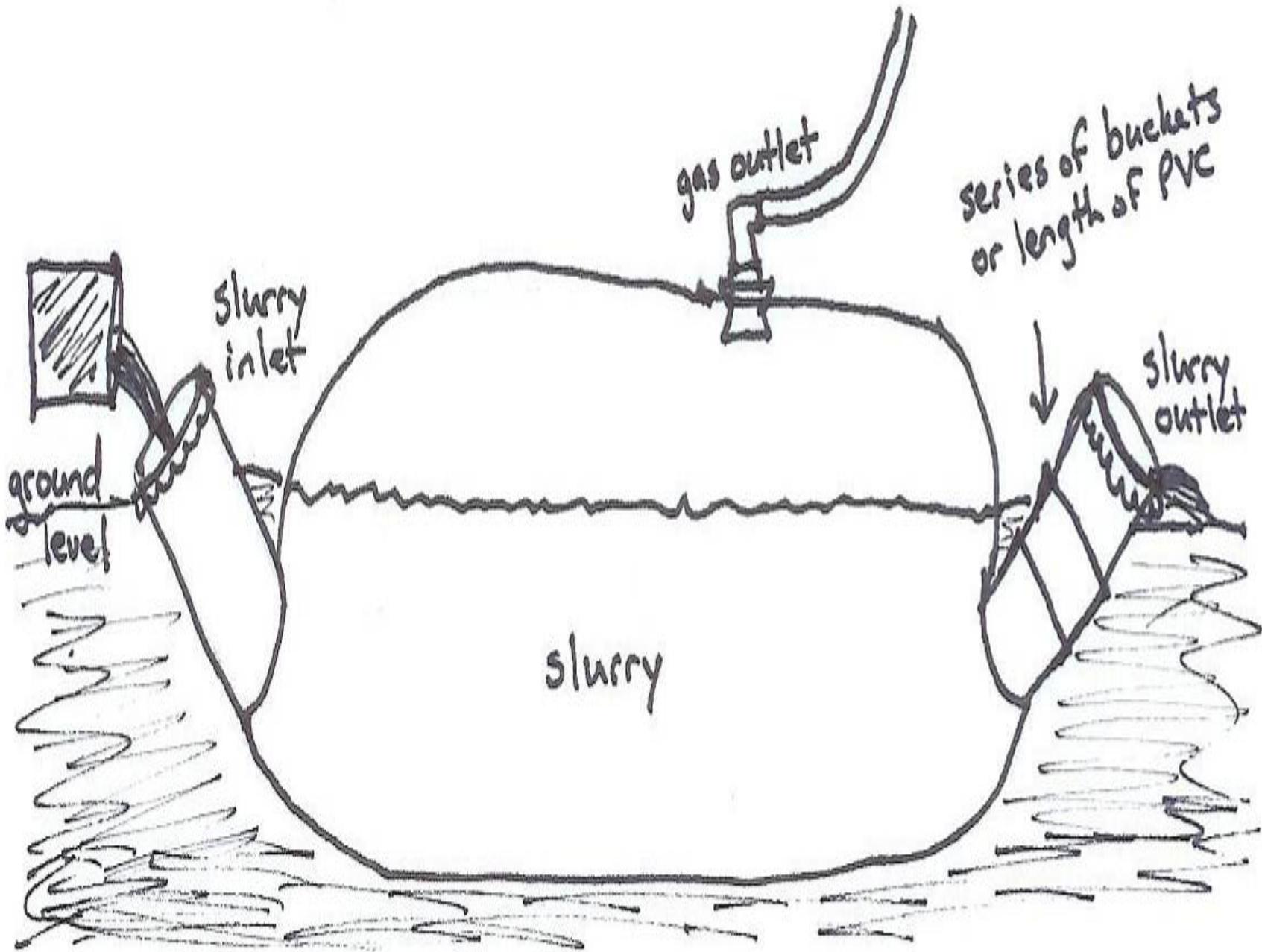
I. Biogas digester

Methane digesters can be divided into two main types: Flow-thru digester and Batch digester.

❖ Flow-thru digester

For this type of digester, the digester is filled and slurry is added regularly to maintain the charge.

A flow-thru digester should have slurry charging opening and expended slurry exit.





❖ Batch digester

A batch digester is one which is filled with slurry, closed and used until it needs recharging.

Once sealed, a batch system can produce biogas for several months (3 to 5 months).

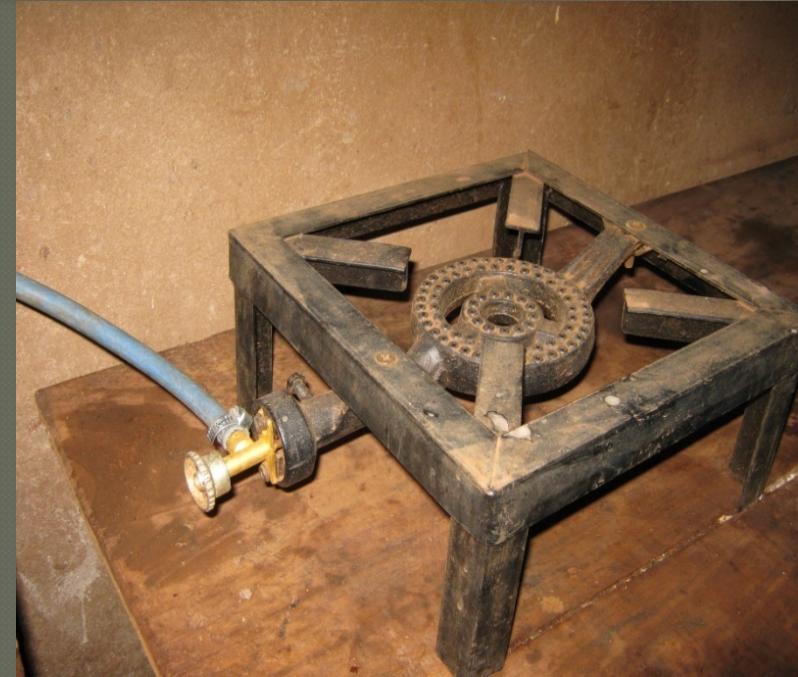
I. A simple batch digester components

This type of digester is a simple construction, with low demand on materials, low in cost and easy to build.

❖ Basic elements

Materials needed to build easily a batch digester:

- One metal or plastic drum 190 liters (55gal) at least;
- Biogas complete valve;
- And some teflon to tighten the valve in the small threaded hole of the drum
- A gas hose;
- An inner tube;
- A simple gas stove;
- Four gas clamps to tie the gas hose with the other parts of the system;
- And slurry



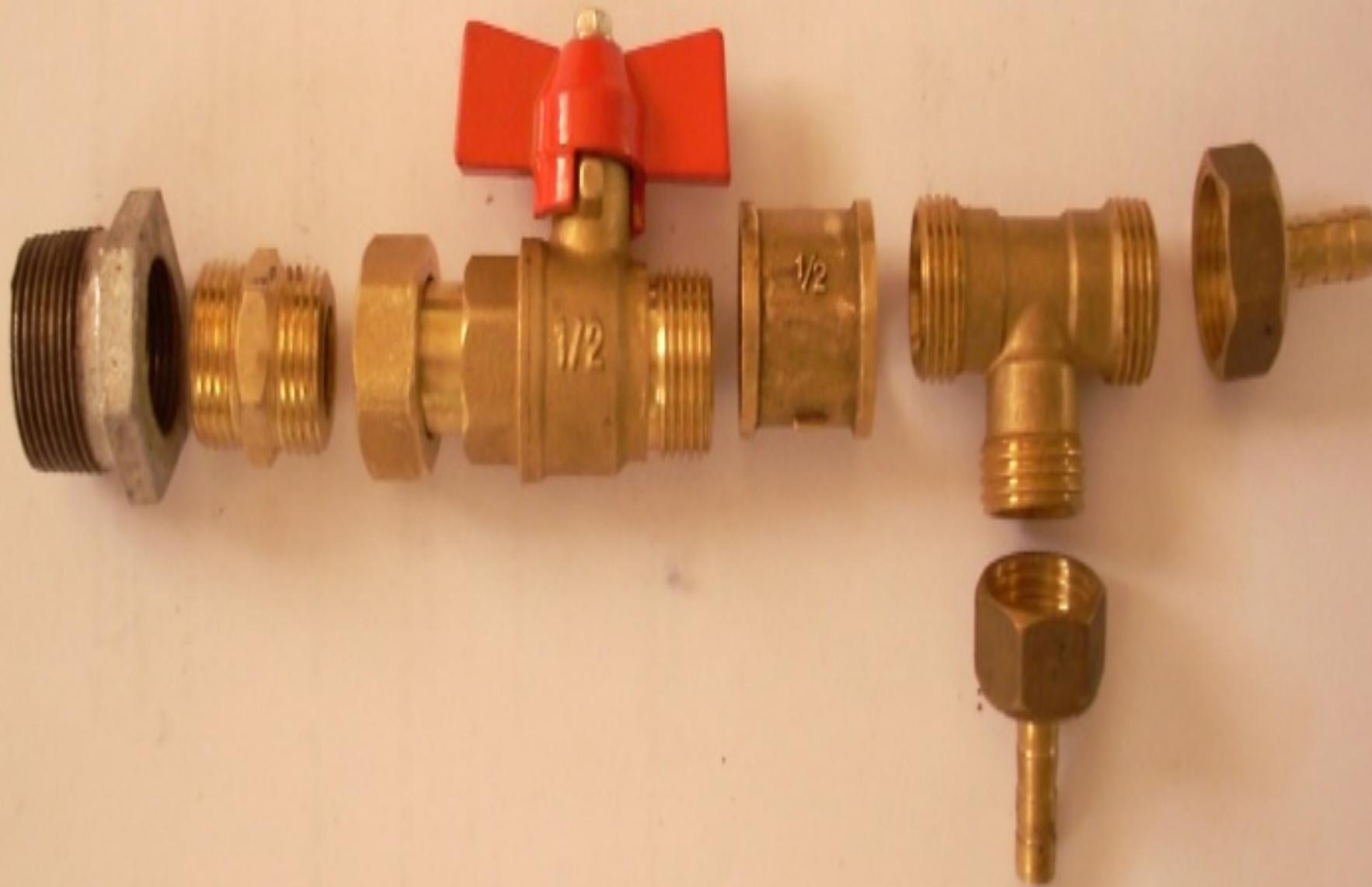


❖The biogas valve

The biogas valve is an important component of digester.

This valve is a kind of tap made by connecting some plumbing parts.

These parts can be copper parts or galvanized parts or PP-R parts.





I. Hints and tips

To build and use successfully a methane digester, here are some practical recommendations and basic principles to respect in order to optimize biogas production.

❖ Necessary conditions for fermentation

- Clean the drum,
- Use organic material,
- Mix manure and water until it forms thin slurry: about 50% water, 50% manure.
- Seal the digester with the manure within in anaerobic conditions.

❖ Practical advice

- For batch type digester, a second unit can be started about 4 weeks after the first unit;
- For all methane digesters, be sure that the unit is always sealed so that air doesn't enter;
- To maximize the gas quantity, several batch digesters can be connected in chain by making adapting the form of valve;
- Remember to purge the system during at least seven days before igniting;
- The digestate is an excellent fertilizer for plants;
- Better to put your digester under shade .

Thank you

