

# Constructing the Biodigester: Feedstock and the biodigester bottle

## A few things to consider before building a biodigester

1. What we will put inside the biodigester?
2. How will we build the biodigester?
3. How will we start up the biodigester?

Now think about the research question your group has written. Are the answers the same?

# 1. Feedstock Preparation

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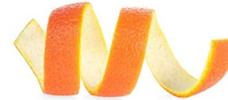


Water

# 1. Feedstock Preparation

**Substrate** is the food that the microorganisms will consume, which they will turn into biogas. It can be any organic matter:

- Spoiled food
- Waste like banana peels or orange rinds
- Grass or dead plants



We also need **inoculum**, which is the source of important microbes. Today we will use goat manure!

Last, we need to use **water** because water is needed for life.

# Feedstock Preparation

Ok, we know we will use **substrate**, **inoculum**, and **water** to create our solution.

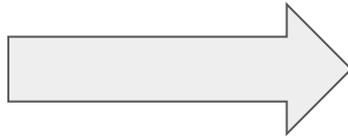
Materials needed:

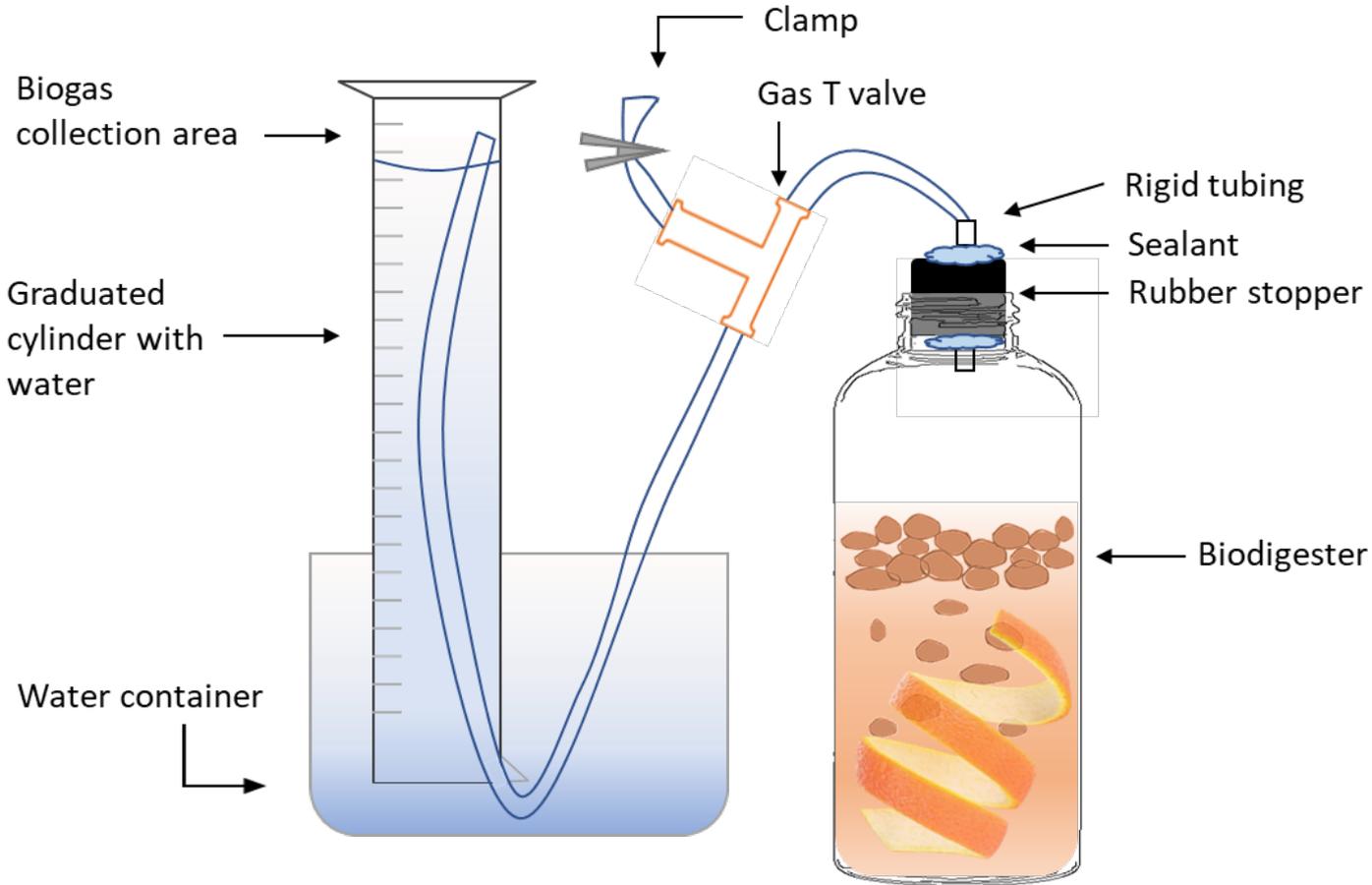
- Gloves
- Lab coat or smock to cover uniform
- 100 mL of substrate/organic matter
- 100 mL of manure
- Medium or large plastic bag
- 200 mL of water
- Measuring cup

# Feedstock Preparation

This recipe will make 400 mL of mixture, which fills a small water bottle about three-quarters of the way. Based on your group's research question, you may want to change the amounts of each ingredient, but make sure to record what goes into the bag.

1. Cut, tear, or mash any big chunks of your organic matter and add 100 mL of it to the bag.
2. Add 100 mL of manure to the bag and mash up inside the bag with hands
3. Add 200 mL of water and mix by shaking the bag or with hands

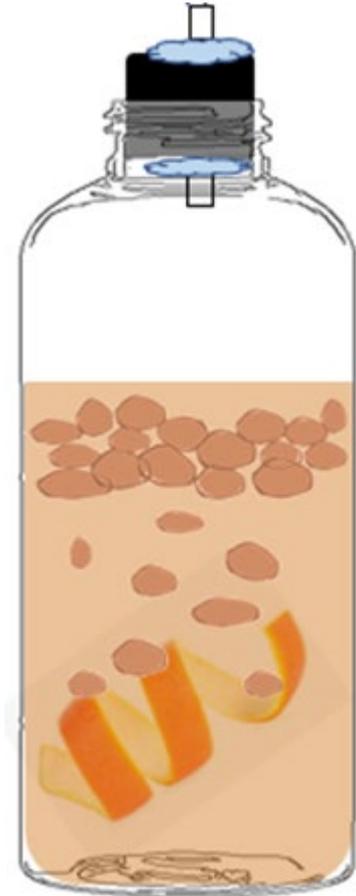




# Building the Biodigester

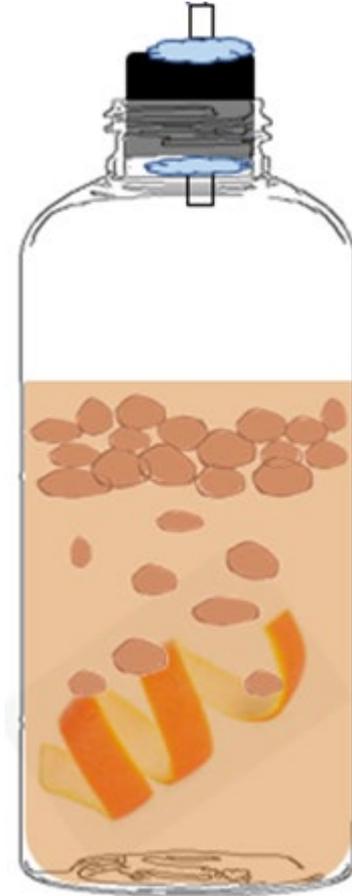
First, let's make the the biodigester itself.  
We need:

- Clear bottle
- 5 cm piece of rigid plastic tubing
- Rubber stopper
- Sealant tape or foam
- Nail and heat source (or drill) to puncture rubber stopper
- Feedstock and inoculum solution
- Funnel



## 2. Building the Biodigester

1. Create a tubing-sized hole in the cap or rubber stopper if it doesn't already have a hole.
2. Slide the rigid plastic tubing all the way through the stopper.
3. Use the sealant tape or foam to seal the edges of the tubing where it meets the rubber stopper on both sides. Set it aside to dry.
4. Using a funnel, fill the biodigester bottle with the inoculum and feedstock solution. Fill up to the top of the bottle with water, recording how much you added.
5. Using your hand or the bottle's original cap, cover the bottle and shake until the contents are well mixed.
6. When the rubber stopper is dry, replace it on the bottle. Your system is set up! Double check that it looks like the system on the right.



# Building the Biodigester

What kind of gas will the biodigester produce today?

Why will we wait a few days before collecting gas?

What do you observe about the biodigester?

