

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 8
INTEGRATED SCIENCE

Week 7

Lesson 2

Topic: Feeding Relationships

Sub-topic: Food as Fuel

Objectives: After reading the handout, students will describe how foods are used as fuel in our body.

Content

Energy from Food- Food as a Fuel

A fuel is any substance which, when combusted or burned, releases energy. This burning does not always take place at a high temperature or within a flame. Burning or combustion is an example of oxidation. Oxygen from the air combines with the particles of fuel, changing those particles and giving energy.

In living things, this process of oxidation takes place gradually. It supplies energy at the rate at which it is required. It is the food which is oxidized to produce energy.

Food waste as fuel

In the process of manufacturing and extracting food substances from plants some unwanted substances from plants are produced. Some of these, if left about and if not properly disposed of could be health hazards. Animals also produce waste.

A major development in the use of food waste as fuel is that of biogas production.

A biogas digester was invented in India, Germany and China. This device uses the dung of cows and pigs as well as, vegetable matter to produce biogas. Biogas is essentially methane. This gas is produced by the process of fermentation caused by bacteria.

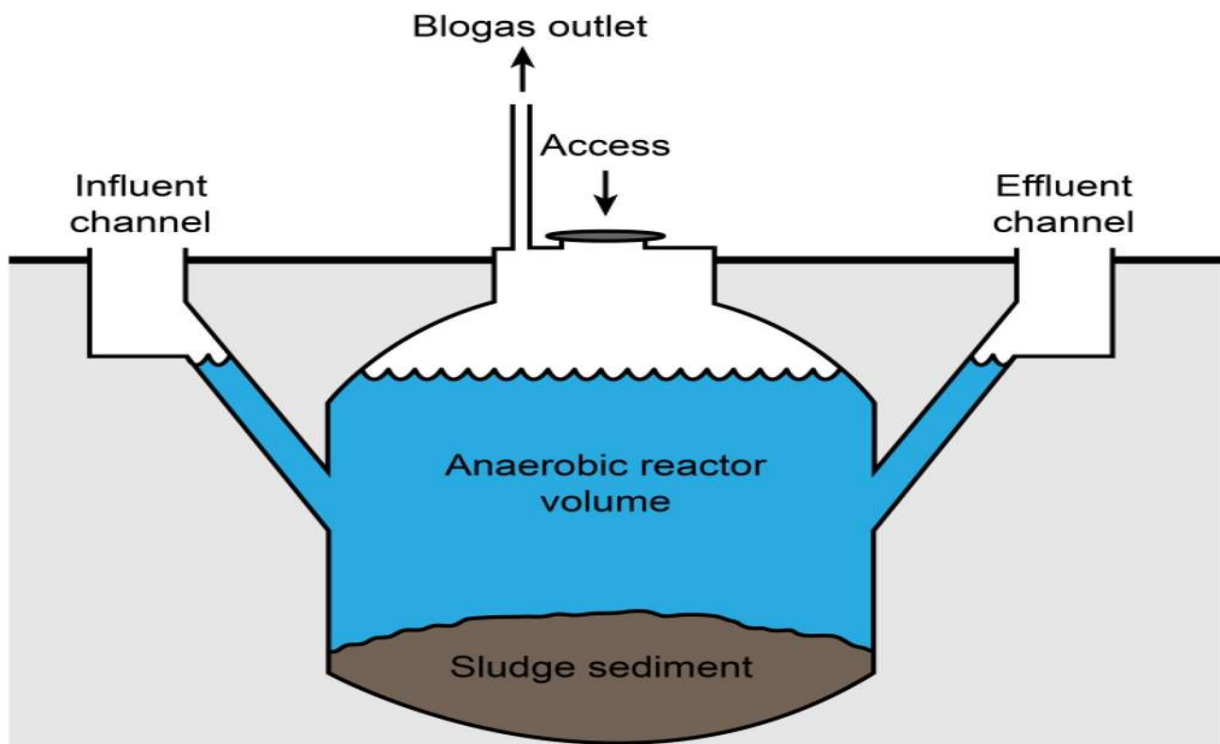
Fermentation not only releases trapped energy in wastes, but it also kills harmful organisms during the process. The further waste produced by this process is used as fertilizers.

Uses of Biogas

The biogas is used in: -

- ❖ Stoves
- ❖ Refrigerators
- ❖ Lighting systems e.g. gas lamps
- ❖ The sugar industry, after the sucrose is extracted from the stems of sugar-cane, the remains are called “bagasse”. This is compressed and used as fuel in boilers in the industry.
- ❖ The Coconut industry, the fibre of the coconut husk is made into brushes and mats. The husk also may be used as fuel. The hard outer covering of the kernel- the endocarp or “shell”- could be used to make charcoal. The charcoal works efficiently in ‘coal pots’.

A biogas digester



Homework

1. Name the gas that is produced in the biogas digester, and state two ways how it is used in your home.
2. In the sugar industry, bagasse is used in boilers to produce steam. What waste is used in the rice industry to produce steam?
3. Do you think this method of producing gas is environmentally friendly? Justify your answer by stating why.

References

1. https://www.google.com/search?q=biogas+digester&hl=en&sxsrf=ALeKk03aswrq3u2gvhAfEvM-K1pAAoEatg:1600203775959&source=lnms&tbn=isch&sa=X&ved=2ahUKEwizi4nNh-zrAhXLmHIEHVRuAhUQ_AUoAXoECA0QAw&biw=1600&bih=740#imgrc=hwq2a3JaGYdbvM
2. Blackman, S., Bernard, M., Dalgety, F., & Sadoo, d.s (2000) Science in Daily Life Bk.2. Georgetown, Guyana. Ministry of Education, Guyana