

Factors affecting bacterial growth



Factors affecting bacterial growth are:

- Oxygen requirement.
- Osmotic pressure (salt tolerance).
- PH.
- Temperature requirement.

Oxygen requirement

Bacteria are divided according to Oxygen requirement:

- **Strict aerobes:** grow only in presence of oxygen.
- **Strict anaerobes:** grow only in absence of oxygen.
- **Facultative anaerobes:** grow in presence or absence of oxygen.
- **Microaerophilic organisms:** grow in small amount of oxygen.

In our bodies

- **The aerobic places:** *skin, eye, mouth, throat, nose.*
- **The anaerobic places:** *deep in tissue, large intestine.*
- **The micro aerobic:** *upper part of stomach.*

How to Achieve Anaerobic condition:

1. Anaerobic hood

2. Anaerobic jar

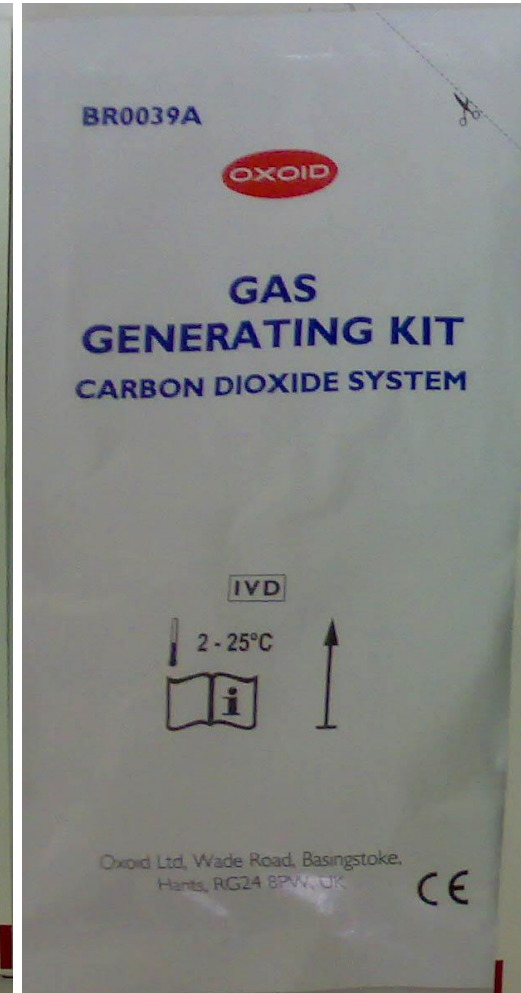
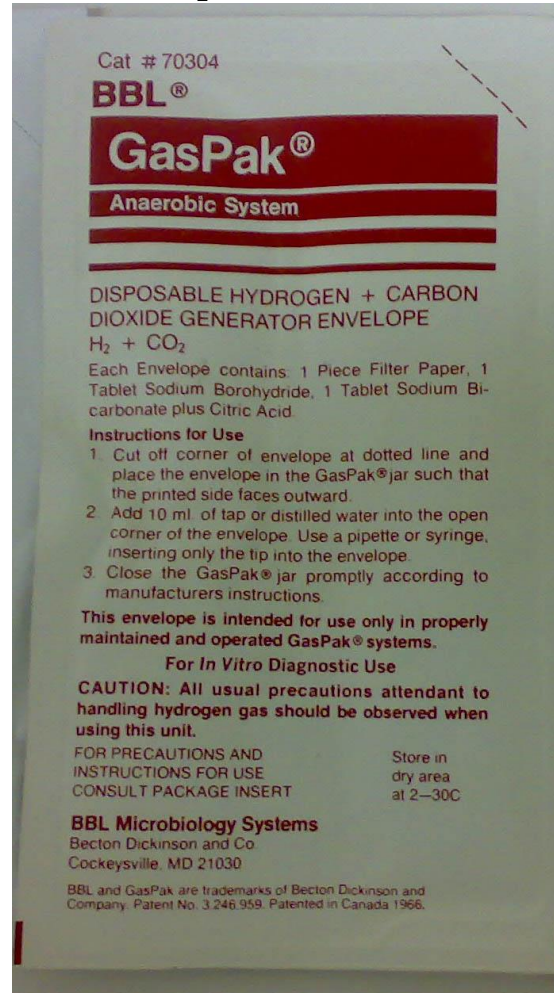
Anaerobic jar:

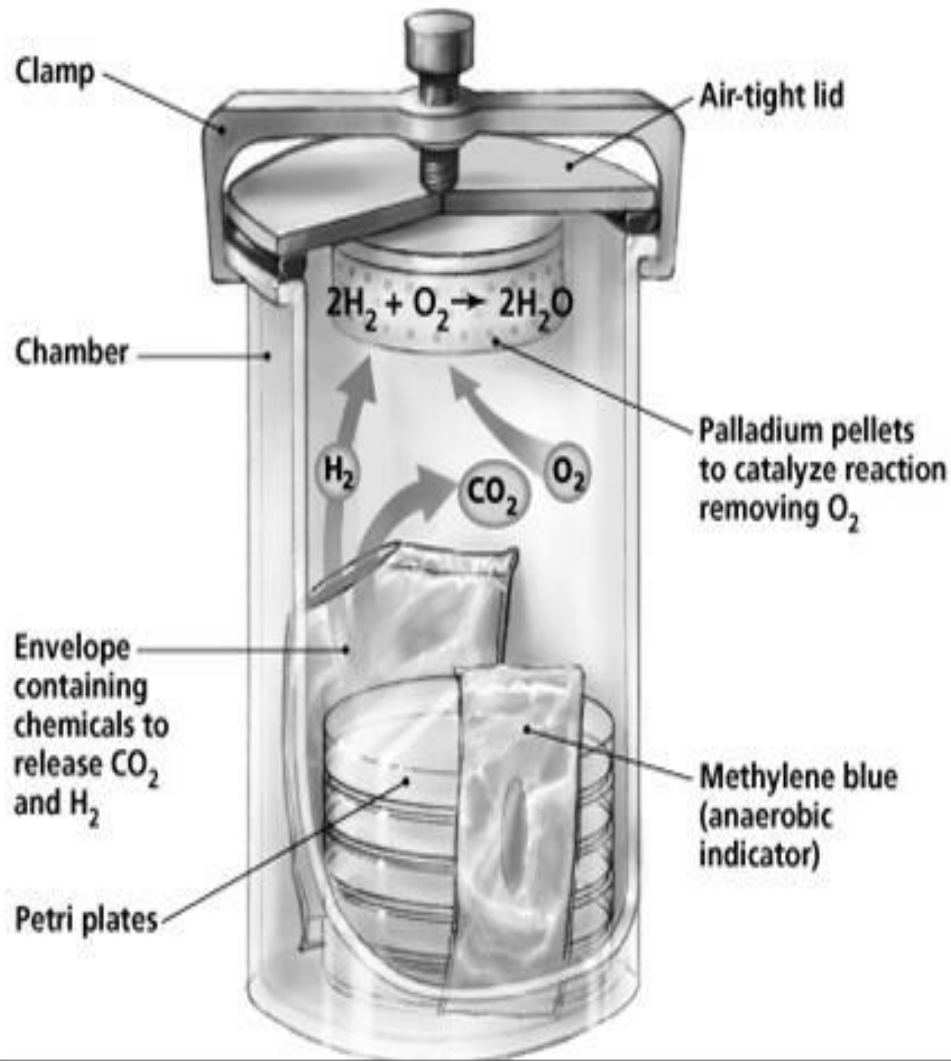
Use gas generating kit which contains chemicals to consume the oxygen present in the jar.

- We add 10 ml water to the gas kit.
- Chemical + H₂O → H₂ + CO₂
- H₂ + O₂ (in jar) **Catalyst** → H₂O (appear as droplet in the jar)
- **Catalyst:** use it to speed up the reaction between H₂ and O₂

Anaerobic condition:

■ Anaerobic Jar + special Kit





Anaerobic indicators

1- Chemical indicator:

- Use anaerobic indicator strip: *Methylene blue*, It is a yellow strip and it turns green or blue in the presence of O₂.

2- Biological indicator:

- *Strict aerobic bacteria* , if it didn't grow that means anaerobic condition.

Or :

- *Strict anaerobe bacteria*, (*Clostridium*)if it grows that's mean anaerobic condition.

Osmotic pressure

Osmotic pressure :

pressure exerted by the flow of water through semi permeable membrane separating two solutions with different concentrations

- Some bacteria require a high level of salt to grow, whereas other bacteria would be killed in high levels of salt.

Osmotic pressure (salt tolerance)

Bacteria vary in their tolerance to salt levels.

- Some can not tolerate high concentration of salt.

Low salt conc.= 1% NaCl

- Some can tolerate medium concentration of salt.

Moderate salt conc.= 5% NaCl

- Some can tolerate high concentration of salt, called:
halophilic.

- **High salt conc.** = 9% NaCl

PH

1. Some bacteria grow at acidic PH (3-6),
Called: **Acidophilic**.
2. Or grow at alkaline PH (8-10), Called:
Alkalophilic /basophilic.
3. Most bacteria grow at neutral PH (7).

Temperature

Bacteria are divided into three groups according to temperature requirement

- **Psychrophiles**: Bacteria grow at cold temp. (4-10 C)
- **Mesophiles**: Bacteria grow at (15C - 45 C)
(most pathogens)
- **Thermophiles**: Bacteria grow at (45C-100 C)

T H A N K

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