KING ABDULAZIZ UNIVERSITY

Lab # 7

The Effects of Radiation on Growth

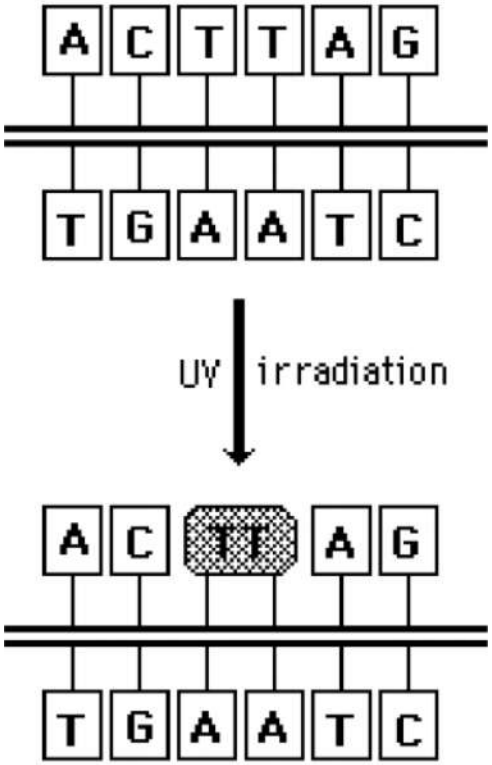
Physiology of microbiology
Bio 336

Radiation damage

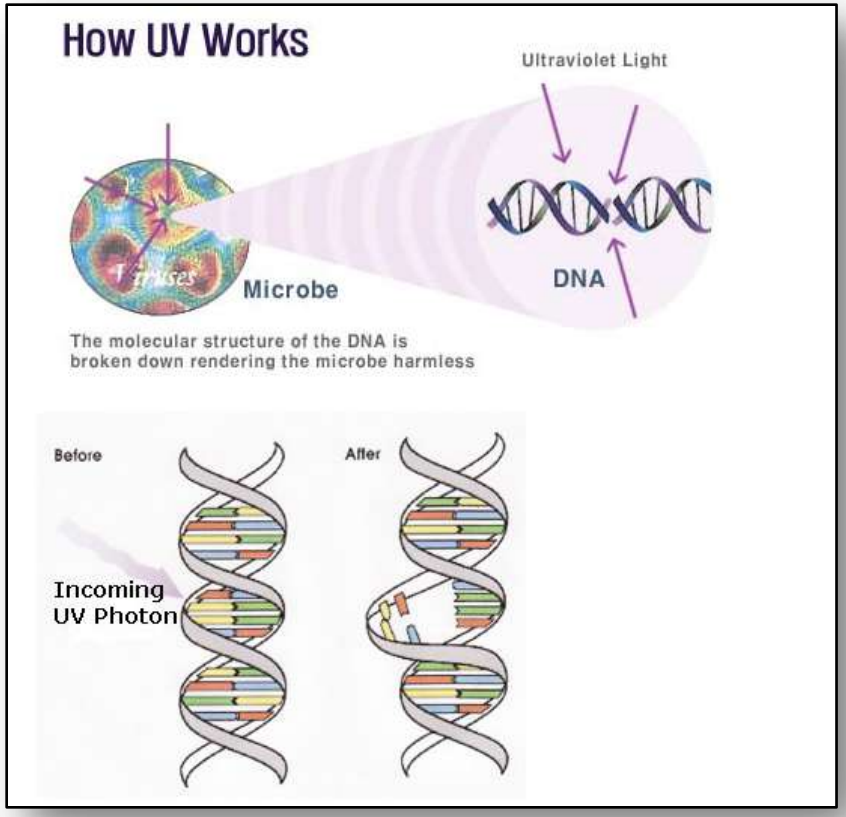
X rays and gamma rays:
mutations → death
disrupts chemical structure of many molecules, including DNA

Ultraviolet (UV) radiation
mutations death
causes distortion in the shape of DNA

UV can directly affect DNA. The most common effect is at locations on the DNA molecule where two thymine (T) bases occur adjacent to each other. UV irradiation causes the two T bases to covalently fuse together. Such structures are called thymine dimers and cause a distortion in the shape of DNA.


A C T T A G
T G A A T C
UV irradiation
A C T T A G
T G A A T C

The Effects of Radiation on Growth



Radiation damage

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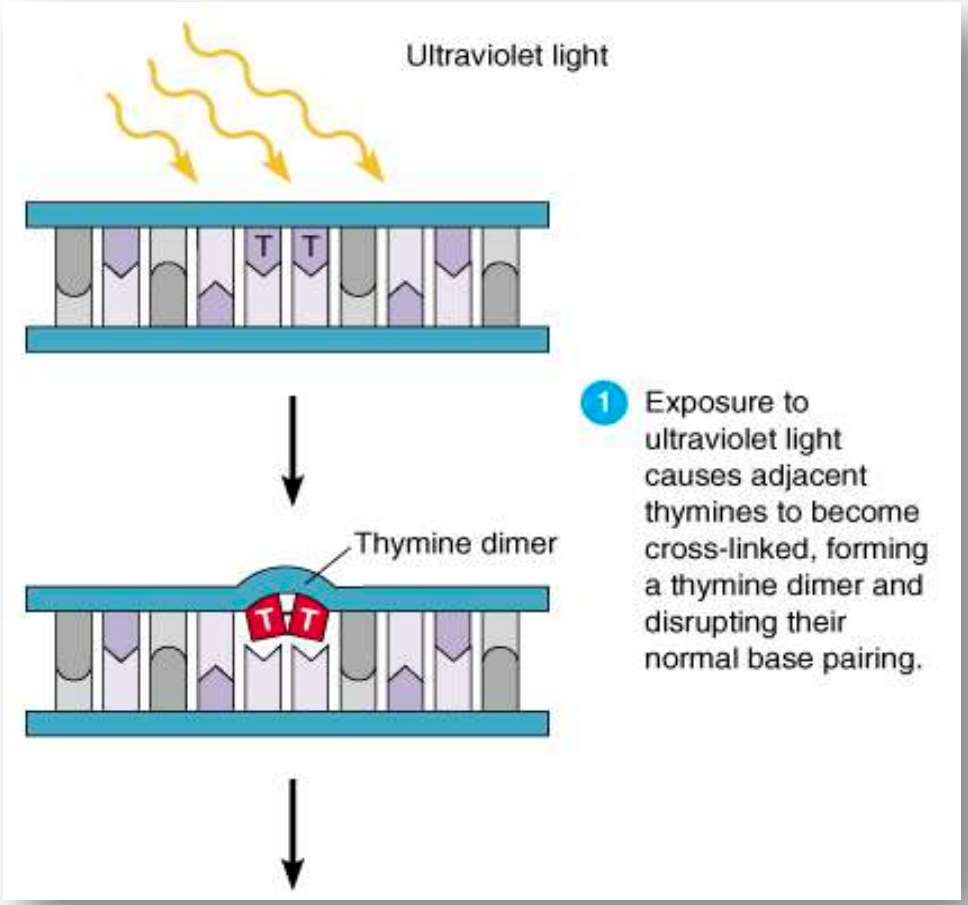
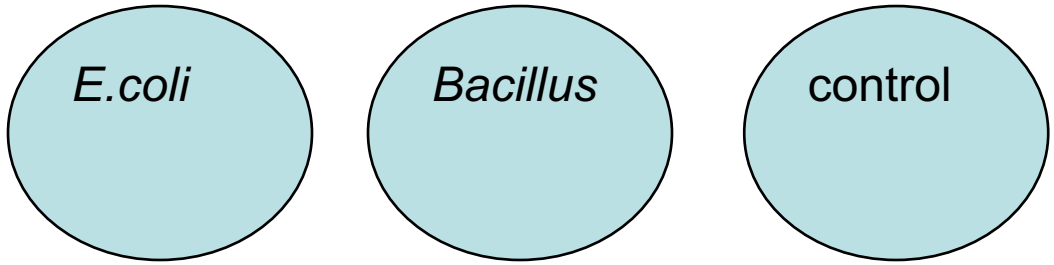


Radiation damage

Experiment # 1

Study the effect of ultraviolet radiation on microbial growth

- Material and Experimental Protocols:



- UV 30 min, then incubate.

The Effects of Radiation on Growth

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The Effects of Free-Oxygen on Growth

Physiology of microbiology
Bio 336

Oxygen: Organisms that use oxygen (O_2) aerobes, produce more energy than anaerobes organisms.

- Microorganisms are classified according to their oxygen requirements:

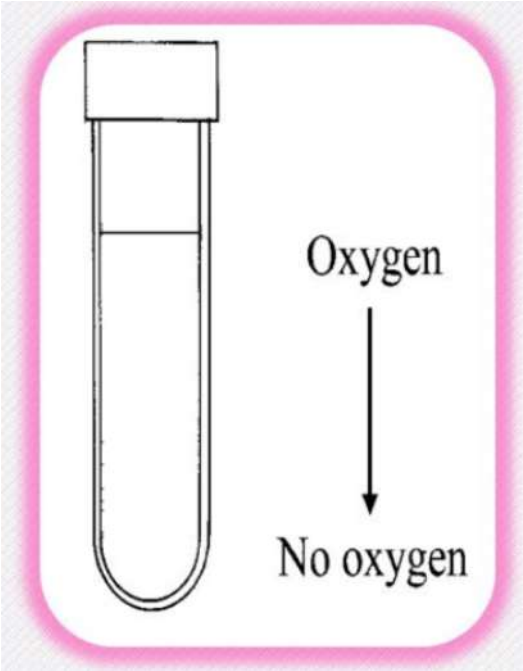
1- Strict (obligate) aerobes : grow in the presence of oxygen.

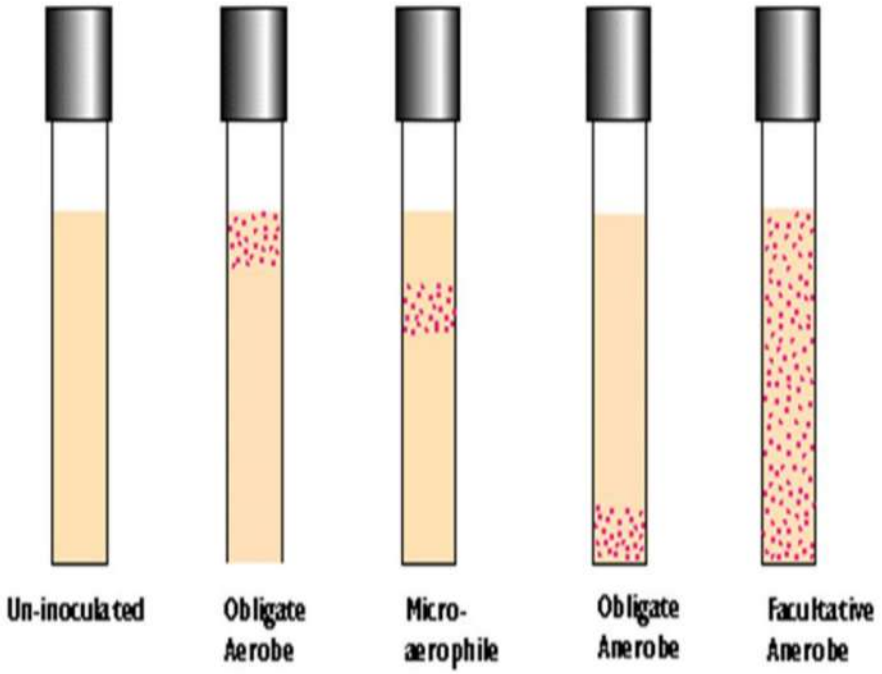
2- Strict (obligate) anaerobes : grow in the absence of oxygen.

3-Facultatively anaerobic : grow either in absence or presence of oxygen.

4-Microaerophilic : grow in the presence of limited amount of oxygen.

Oxygen requirements (thioglycollate broth)





Oxygen Requirements: Study the effect of Free-Oxygen on Growth:

Procedure 1:The shake cultures :

a deep culture of agar which the inoculum is evenly distributed by shaking before the medium is solidified and which is used chiefly for the demonstration of anaerobic colonies

Experiment # 1

- Material and Experimental Protocols:

- Difference between shaking culture and deep culture :
- In shaking culture we will use the loop and the growth will be as a lees also the media will be liquid.
- In deep culture we will use the needle and the growth will appear along the inoculation line .

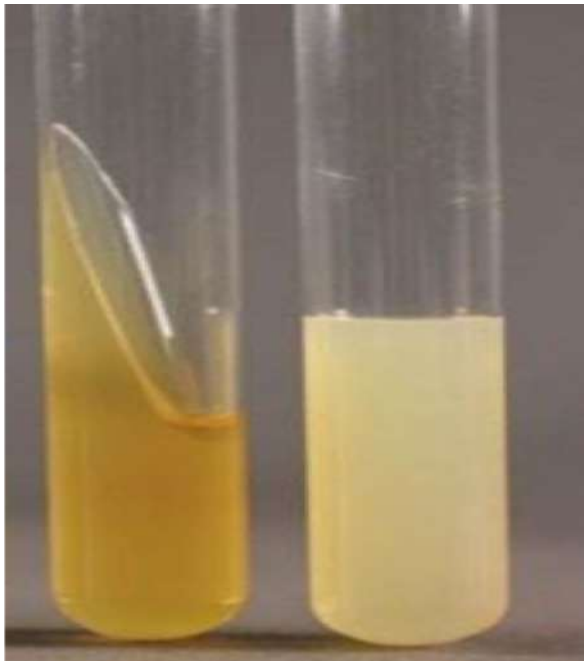
Bacillus species can be either obligate aerobes or facultative anaerobes.

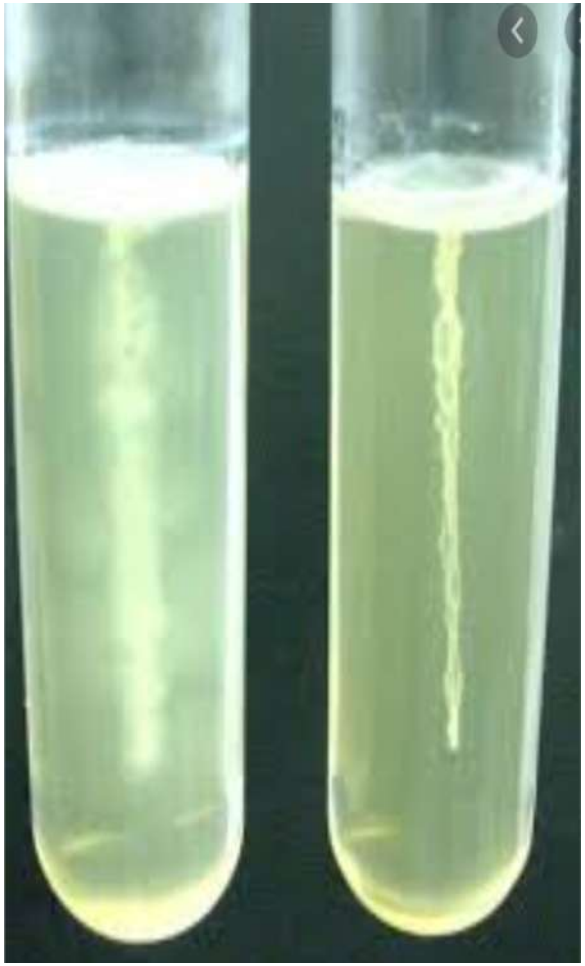
E.coli is **facultative anaerobic** if oxygen is present, but is capable of switching to **anaerobic** respiration if oxygen is absent

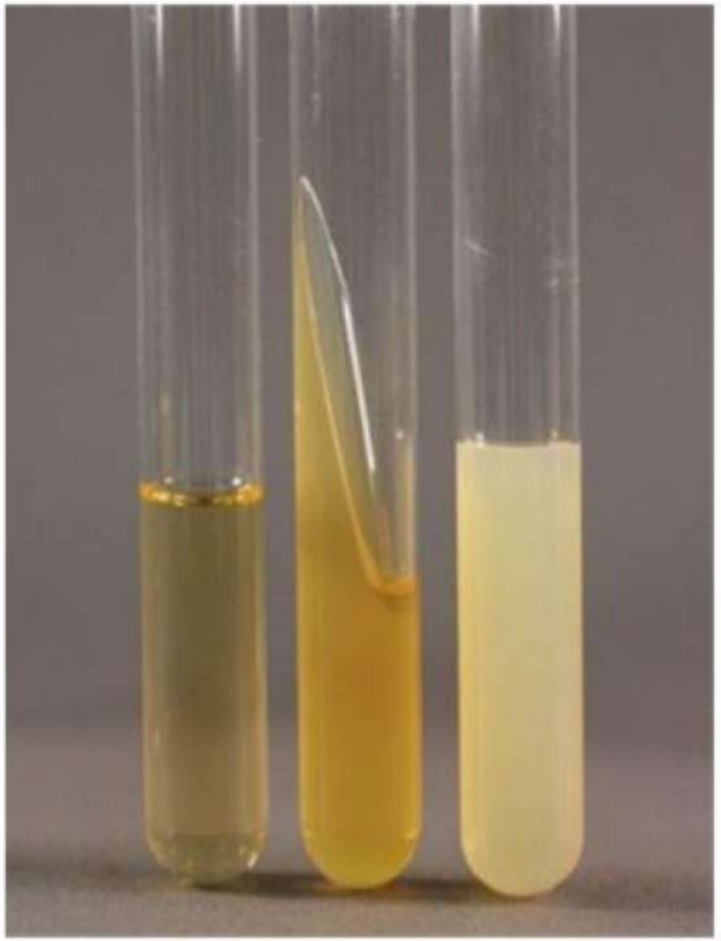
Procedure 2: The stab culture (deep) and slant

Experiment # 2

- Material and Experimental Protocols:

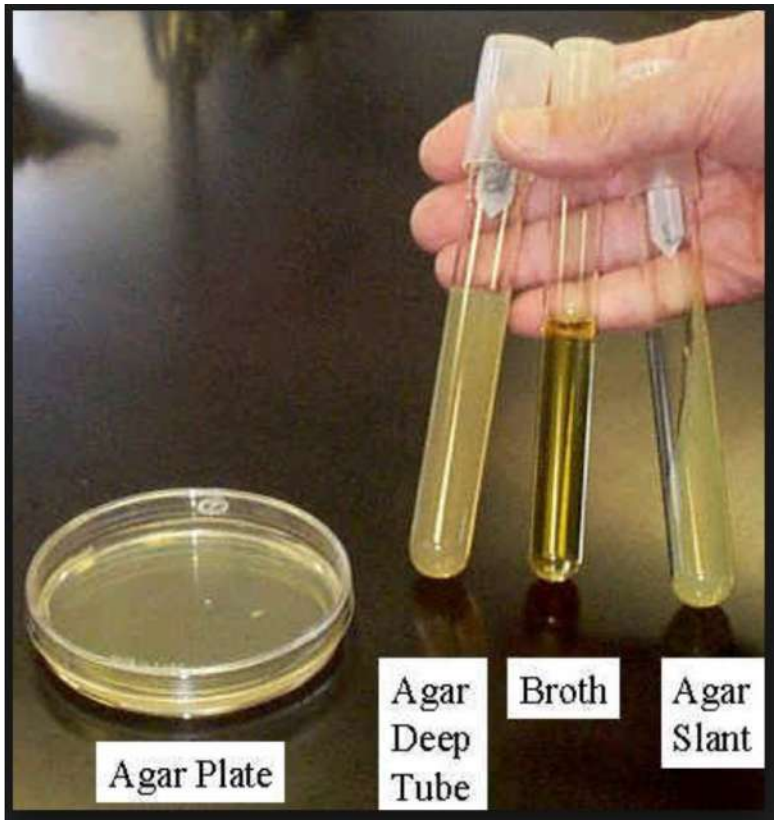






Broth Slant Deep

The Effects of Free-Oxygen on Growth



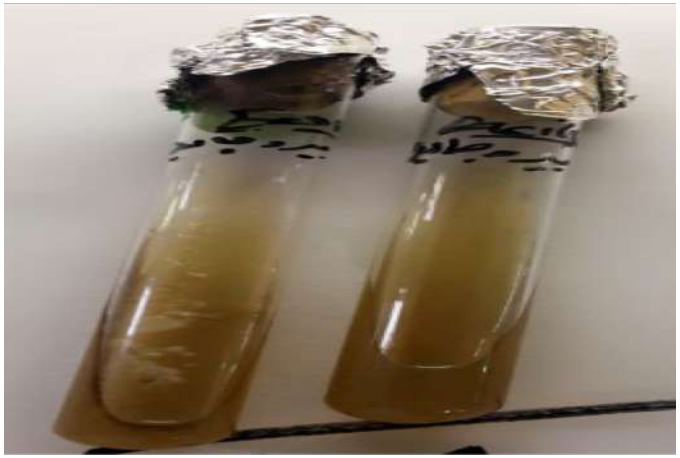
The Effects of Free-Oxygen on Growth

Procedure 2: pyrogallic acid method

Cultivating Anaerobes

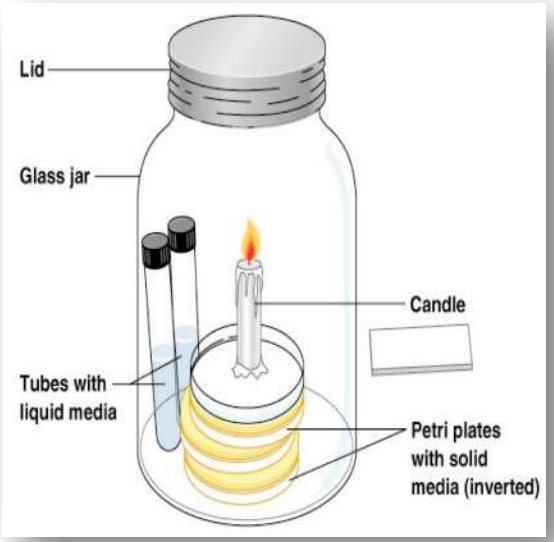
Experiment # 3

- Material and Experimental Protocols:

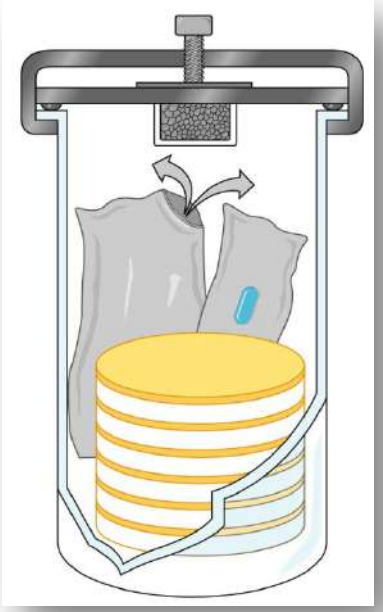


The Effects of Free-Oxygen on Growth

Anaerobic chamber •



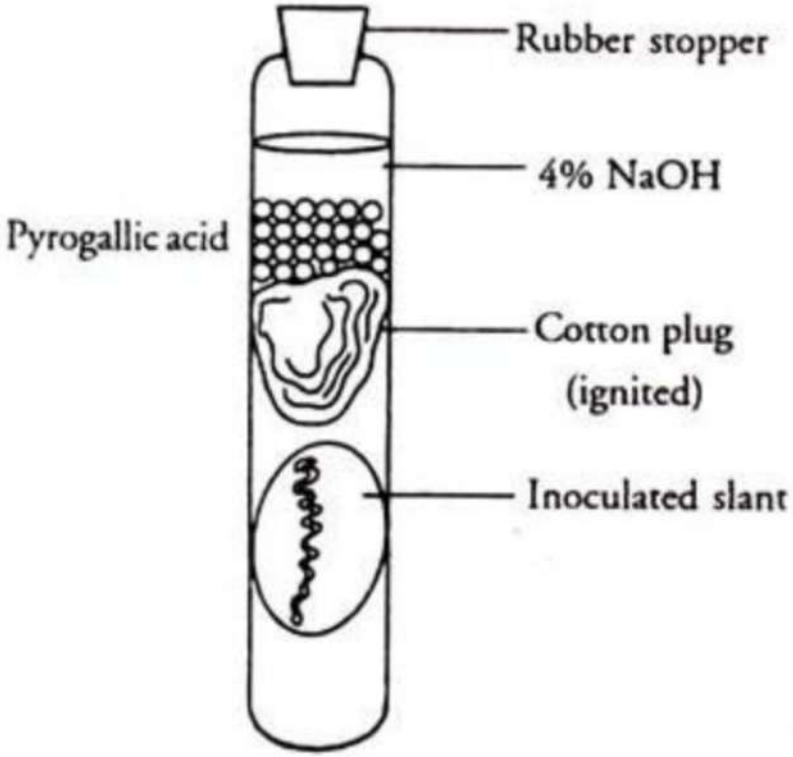
Candle jar



anaerobic jar

Anaerobic Culture Methods

The Effects of Free-Oxygen on Growth



https://www.youtube.com/watch?v=bRadiLXkqoU

https://www.youtube.com/watch?v=z4qrnMlhbpE