

MEDICAL MICROBIOLOGY

LAB 3

Bacterial culture media



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Culture media

Is the mixture of nutrient substances or any substances which provides nutrients for the growth of microorganisms .

Media constituents

1. Agar

Is a complex polysaccharide isolated from seaweed . Is added in a concentration of 1.5 % to solidify liquid media . Its gelling properties is used for the preparation solid and semi-solid culture media . Its insoluble in cold water but soluble when heated at about 100 °C and becomes solidified at 45 °C.

2-Peptone

It is a product of varying composition made by acid or enzymatic hydrolysis of animal or vegetable protein , from materials such as liver , milk , muscle etc .

3-Yeast Extract

Is made from bakers or brewers yeast and other materials . In culture media it is used to supplement or replaced meat extract .

4-Meat Extract

Commercial meat extract contain soluble organic bases , protein , vitamins and minerals . Beef heart , liver , brain , spleen etc are used to prepare meat extract.

According to the nature of their composition culture media may be divided into three major groups :

1-Natural media : Media which contain infusion of natural substances , the exact chemical composition is not known . such as meat extracts .

2-Semi-synthetic media : Is mixture of known and unknown composition substances . Examples potato dextrose agar (PDA).

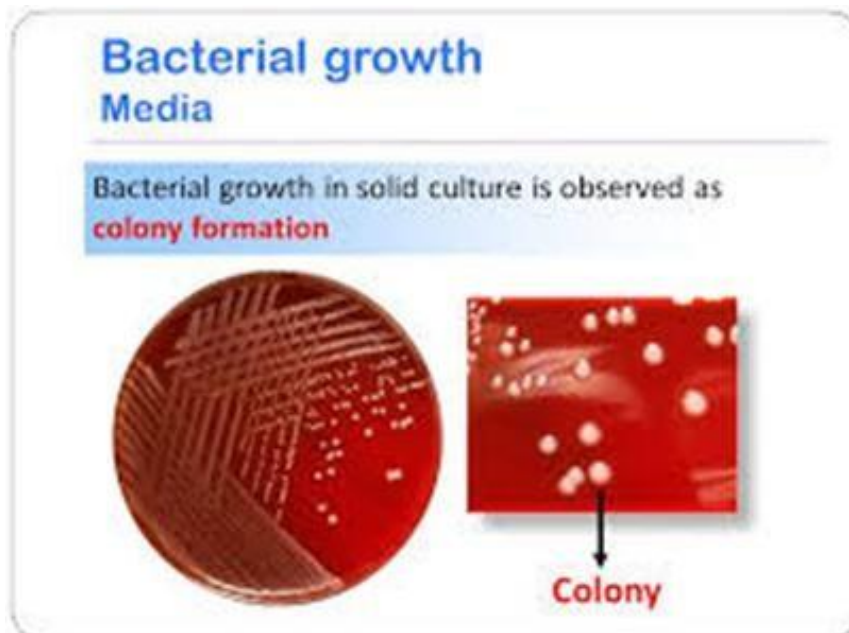
3-Synthetic media (defined media) : Media which contains substances that are chemically known such as carbon , vitamins , phosphate etc.

On the basis of consistency media can be classified into three groups :

1-Solid media : These media are widely used in the laboratory (slant , petri dishes / plate) due to the advantage of their use . One can see the bacterial colony on the agar medium and colony characteristics help in the determination and identification of many bacteria .

Colony

A cluster of microorganisms growing on a solid medium . It is arises from a single cell.

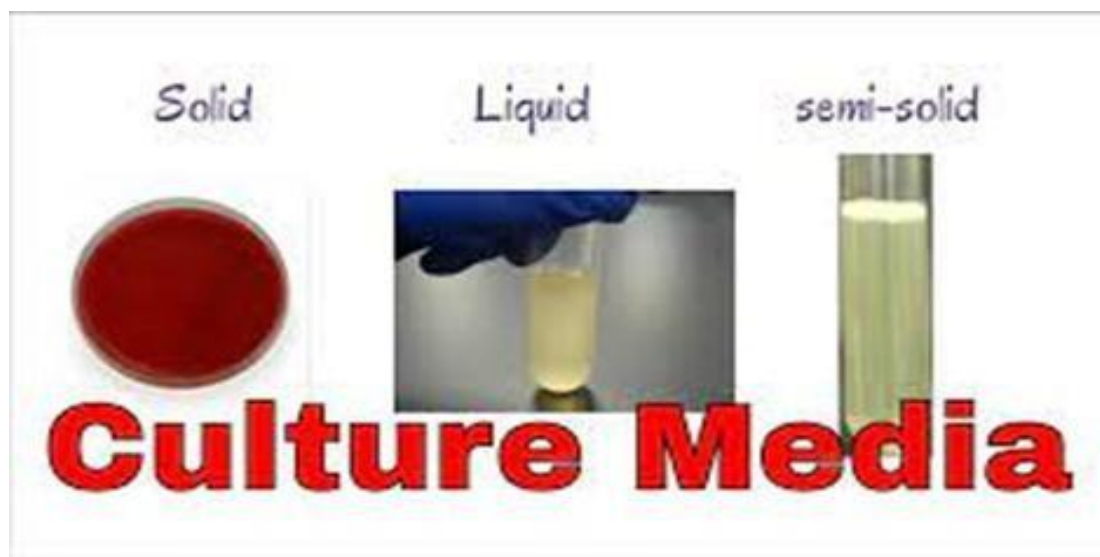


2-Liquid media : This media called broth . Bacterial colony can not be observed in this media but this media is used for the study of many

biochemical characteristics of bacteria . Besides that samples of pathogens can be directly placed in this media . Bacterial growth in liquid media is observed as pellicle (growth on the top of the medium) , sediments , and turbidity .



3-Semi –solid media : This type of media contain agar at concentration 0.3-0.5 % and is not frequently used in the laboratory, is used for preservation of bacterial isolates and for observation of bacterial motility.



Based on function , media can be classified as follows :

1-Ordinary media : This media contains the basic nutrients for the growth of microorganisms , for example nutrient agar and nutrient broth.



Nutrient broth

Nutrient agar

2-Enriched media : This media containing sufficient amount of essential substances for growth of bacteria , such as blood agar medium and chocolate agar .

Blood agar plate (BAP)

Contain mammalian blood (usually sheep or horse) at a concentration of 5-10 % .Is differential media used to isolate fastidious organisms and detect hemolytic activity.

1- β -hemolytic : Activity will show lysis and complete digestion of red blood cell.

2- α -hemolysis : will only partially lyse

3- γ - hemolysis : non –hemolytic



Blood agar



Hemolysis in blood agar

3-Selective media (Inhibitory media) : These media contain substances (dyes , an antibiotic , and various inhibitory) which help to prevent or suppress the growth of undesired organisms and permitting others such as macConkey agar , Salmonella Shigella agar (SS agar) , manitol salt agar . Example: incorporation of sodium chloride (7.5-10%) into **manitol salt agar** selects for the *Staphylococci* but inhibits the growth of other bacteria that cannot tolerate the salt concentration .

MacConkey agar

It contains bile salts (to inhibit gram – positive bacteria) , lactose , peptone , crystal violet dye , neutral red dye (which stains microbes fermenting lactose) .

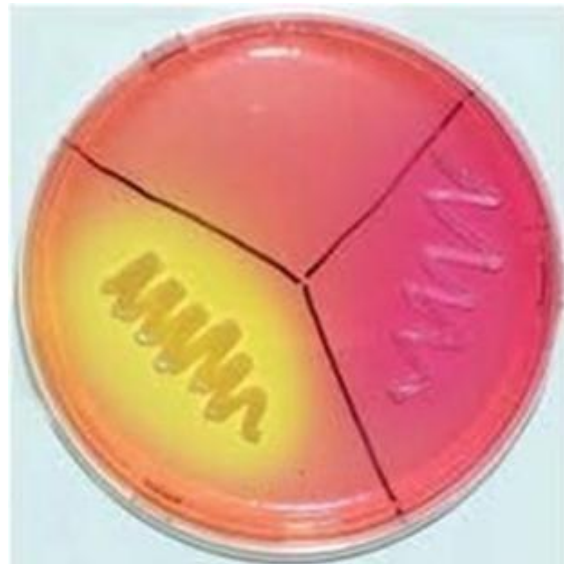


MacConkey agar

4-Differential media : A medium contain substances that cause some bacteria to take on an appearance that distinguishes them from other bacteria . such as Eosin methylene blue agar (EMB agar) , manitol salt agar , macCokey agar .

Manitol salt agar

When *Staphylococcus aureus* grows on manitol salt agar , it ferments manitol , changing a pH indicator from red to yellow around colonies . Other *Staphylococci* cannot ferment manitol , and their growth on this medium results in no change in the indicator .



Manitol salt agar