Department of biology

Microbiology Lab

((Culture Media))

Lab/10

2 stage

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Culture Media:

Culture media are mediums that provide essential nutrients and minerals to support the growth of microorganisms in the laboratory.

Culturing microorganisms is essential for diagnosing infectious diseases, obtaining antigens, developing serological assays for vaccines, genetic studies, and identification of microbial species, Furthermore, it's also essential for isolating pure cultures, storing culture stock, studying biochemical reactions, testing microbial contamination, checking antimicrobial agents and preservatives effect, testing viable count, and testing antibiotic sensitivity.

However, there are also microorganisms that can't grow on a culture media at all in any condition – these are called **obligate parasites.**

Microorganisms have varying nature, characteristics, habitat, and even nutritional requirements, thus it is impossible to culture them with one type of culture media.

Classification and Types of Culture Media

A. Classification of culture media based on consistency

1-Solid media: In these media, the agar which is an unbranched long chain of polysaccharides is added in the concentration of 1.5-2.0%. Most commonly, 1.3% agar is used to prepare solid media in labs. The agar-containing media solidifies at 37 ^{o}C. Sometimes, in the place of agar, some other inert solidifying agents are used, such as gellan gum, Examples of solid media are blood agar, nutrient agar, McConkey agar, and chocolate agar

2- Semisolid media: This media has 0.2-0.5% agar concentration, and due to the reduced agar concentration, it appears as a soft, jelly-like substance. It's mainly used to study the motility of microorganisms, distinguish between motile and non-motile bacterial strains (through U-tube and Cragie's tube), and cultivate microaerophilic bacteria – bacteria on this media appear as a thick line. Examples of semi-solid media are: Hugh and Leifson's oxidation fermentation medium, Stuart's and Amies media, and Mannitol motility media.

3- Liquid media: These media do not contain any traces of solidifying agents, such as agar or gelatin, and large growth of bacterial colonies can be observed in the media. Liquid media are also called broths, they allow for uniform and turbid growth of bacterial strains when incubated at 37ºC for 24hrs. The media is used for the profuse growth of microorganisms and fermentation studies. Examples include Tryptic soy broth, phenol red carbohydrate broth, MR-VP broth, and nutrient broth.

B. Classification based on the nutritional component

1-Simple media: It's a general-purpose media that supports the growth of non-fastidious microbes, and it is primarily used for the isolation of microorganisms. Examples are nutrient broth, peptone water, and nutrient agar.

2-Complex media: These are media containing nutrients in unknown quantities that are added to bring about a particular characteristic of a microbial strain. Examples are tryptic soy broth, blood agar, and nutrient broth.

3-Synthetic media: Synthetic media is a type of chemically defined media and is produced from pure chemical substances. A defined media

refers to a medium having a known concentration of ingredients, like sugar (glucose or glycerol) and nitrogen source (such as ammonium salt or nitrate as inorganic nitrogen). It is generally used in scientific research, and an example is Czapek Dox Medium.

Classification of culture media based on application/chemical composition:

1- Basal media

2-Enriched media

3- Selective media

4- Enrichment media

5- Differential or indicator media

6- Transport media

7- Anaerobic media

8- Assay media

9- Storage media