

Difference Between Selective and Differential Media

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Key Difference - Selective vs Differential Media

Microorganisms are often grown under laboratory conditions for various purposes. Growing microbes is feasible only if they are provided with a suitable culture medium and other optimal growth conditions such as pH, and temperature. A culture medium is defined as a solid or liquid preparation which includes the necessary ingredients and conditions to grow, transport and store microorganisms. Many different types of media are used to culture microorganisms. Selective media and differential media are two important and commonly used media types among them. The key difference between selective media and differential media is that **selective media are used to grow and isolate a specific type of microorganism by suppressing the growth of other microorganisms** while **differential media are used to visually distinguish microorganisms from one another**. A variety of selective and differential media are used in various types of microbiology laboratories.

What are Selective Media?

Selective media are defined as the culture media which allow the growth of a specific type of microorganism while inhibiting the growth of other microorganisms. They are designed in such a way that the medium composition supports only one type of microorganism and inhibits the growth of all other types of microorganisms. They are formulated to isolate and identify a particular type of microorganism. Hence, selective media contain antimicrobials, dyes, alcohols, etc. for the inhibition of unwanted microorganisms. Different types of selective media are available. EMB agar, Mannitol Salt agar, MacConkey agar, and Phenylethyl Alcohol (PEA) agar are several routinely used selective media in laboratories.

The selectivity of the medium can be achieved by employing several methods and by adding certain inhibitors to the medium. For example, if a particular microbe has the ability to utilize a specific sugar type, a selective medium for that particular microbe can be prepared by making that specific sugar type as the only carbon source available in the medium. Specific inhibitors also can be included into media at various concentrations to suppress the growth of nonspecific microorganisms.

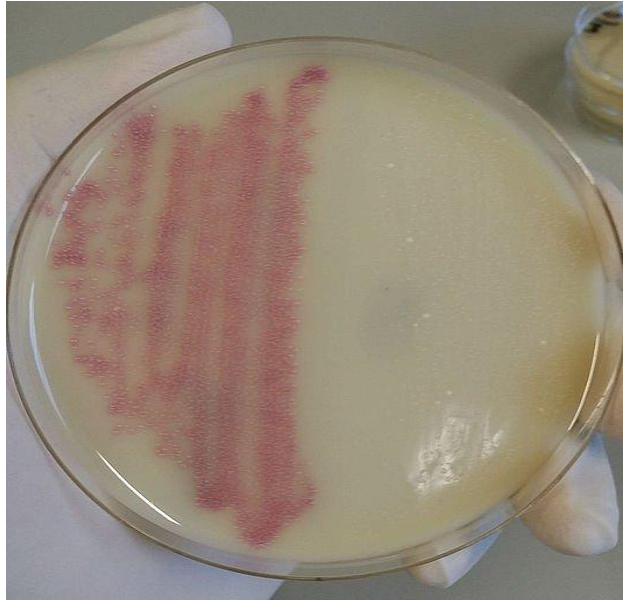


Figure 01: Methicillin-resistant *Staphylococcus aureus* selective medium

What are Differential Media?

Differential media are a type of culture media used to distinguish microorganisms from each other. When microbes are grown in differential media, they produce visible characteristic changes or different growth patterns which are helpful to identify and differentiate microorganisms from one another. Differential media are designed by targeting the biochemical properties of the targeted microorganisms. Unlike selective media, differential media are not included with the chemical which suppresses or inhibits other microorganisms. It indicates only if the target microorganism is present in the medium by showing a different growth pattern or visible change.

Differential media can also be used to differentiate closely related microorganisms or groups of organisms. Some media can be both selective and differential. Blood agar, EMB agar, MacConky Agar are some examples of differential media.

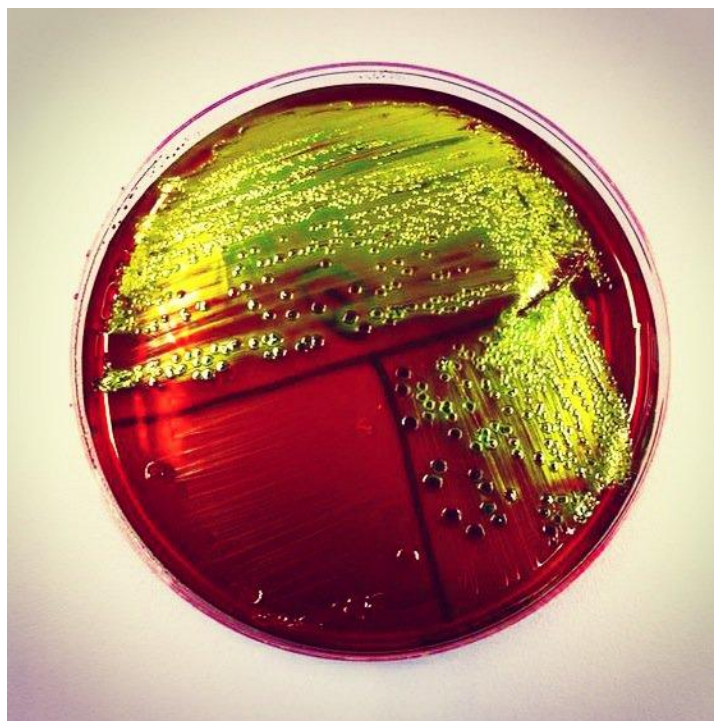


Figure 02: Differential medium – E Coli characteristic colonies on EMB agar

What is the difference between Selective and Differential Media?

Selective vs Differential Media	
Selective media are the culture media designed for the growth of a selected organism while inhibiting the growth of other microorganisms.	Differential media are the culture media designed to distinguish microorganisms from one another by visible growth characteristics.
Purpose	
Selective media are designed to isolate and identify a specific group of microorganism.	Differential media are designed to differentiate microorganisms from one another.
Composition	
Selective media contain certain specific nutrients for growth of a particular microorganism and contain dyes or toxic substances to inhibit the growth of other microbes.	Differential media contain nutrients which are utilized differently by microbes and generally do not contain inhibitors to suppress other microbes.

Examples

EMB agar, Mannitol Salt agar, MacConkey agar, and Phenylethyl Alcohol (PEA) are examples of selective media.

Blood agar, EMB agar, and MacConky agar are examples of differential media.

Summary - Selective vs Differential Media

Culture media are used to grow, isolate, differentiate and identify microorganisms. Media are included with necessary nutrients for the growth of microorganisms. There are different types of media available for the culturing purpose. Selective media and differential media are two types of growth media. Selective media allow the growth of a specific type of microorganisms and inhibit the rest of the other microorganisms. Differential media distinguish the microorganisms by allowing them to produce visible growth pattern or different characteristics on the media. This is the difference between selective media and differential media. Certain media work as both selective and differential media.

References:

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