Lecture 3

I. Pure cultures

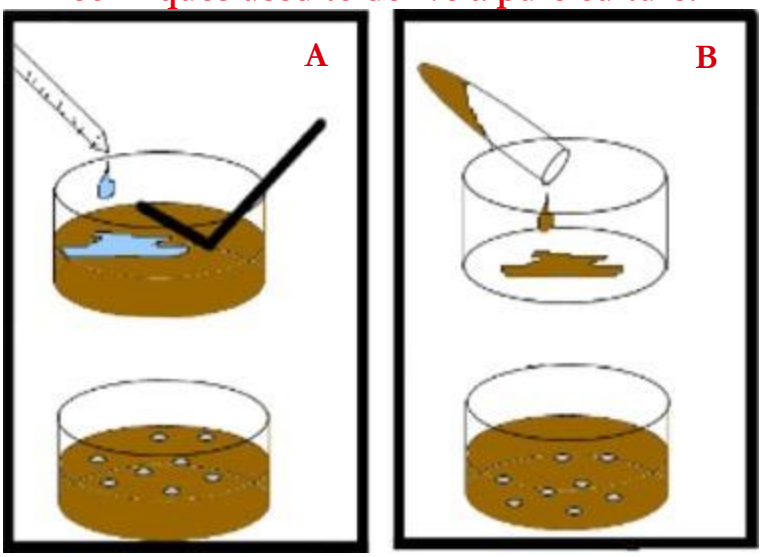
A. Are cultures that are derived from _____ bacterial cell and thus contain only one species.

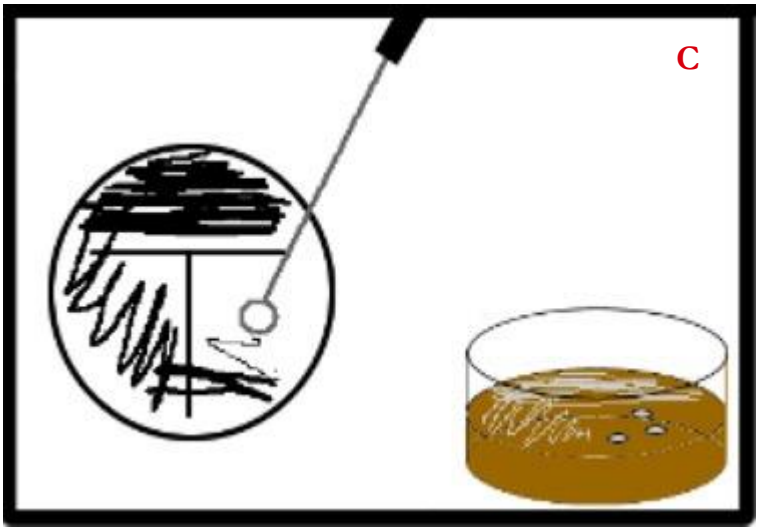
B. Are _____

1. Most ecological niches harbor _____ of microorganisms (Example: _____)
2. Clinical specimens contain both _____ (disease-causing) and _____ microorganisms (e.g. urine samples and throat swabs).

C. Deriving a pure culture is very important because it allows us to _____, characterize, study, and, perhaps most importantly, develop _____ strategies to control the microorganism.

Techniques used to derive a pure culture:





II. Techniques used to derive a pure culture:

A. _____: Dilute original culture and spread on an agar plate; colonies then form on the agar surface .

B. _____: Dilute original culture and add to molten agar; colonies then form on the subsurface of the agar .

C. _____: The original culture is _____across the agar surface using an inoculating loop. Isolated colonies form on the agar surface.

1. It is possible that a single colony on a streak plate could contain a minute level of contamination. Therefore, we _____ _____ another plate for an absolutely pure colony.
   i. Characteristics of a contaminated colony:
      a. _____
      b. Different colors
      c. Different _____ (mucoid on one side and dry on the other)
2. Pay attention to this streak plate demonstration. Be absolutely certain you are competent and confident with the triplet-streak technique.

III. Culture medium

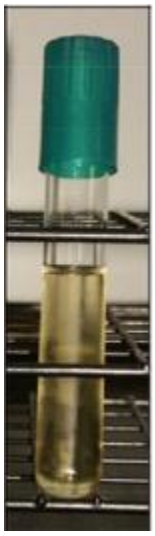
A. The _____ (macroelements):

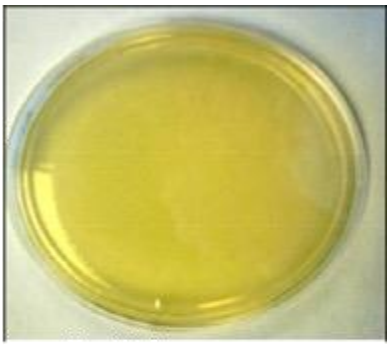
1. _____
   i. Components of carbohydrates, lipids, _____, and _____.
2. Potassium ions, _____, magnesium ions, and _____ ions
   i. Required for _____ activity
3. Some culture media contain _____, such as amino acids and vitamins. These media support the growth of organisms that _____from the major elements.

4. _____:
   i. Manganese, molybdenum, _____, cobalt, nickel, and _____.
      a. Usually aid in _____and maintenance of protein structure

B. Defined vs. undefined, or complex, media
   1. A _____ medium is made by weighing out every potential nutrient component carefully (i.e. glucose, ammonium sulfate, etc.)
      Advantages: We know _____ and it is therefore useful in determining _____of a particular organism.
      Disadvantages: _____, complicated preparation
   2. An _____, or complex, medium is prepared with complex natural extracts and digests of _____.
      Advantages: Easy preparation, inexpensive
      Disadvantages: Cannot be used to define precise growth _____ because we don't know exactly what's in it.

Types of Media



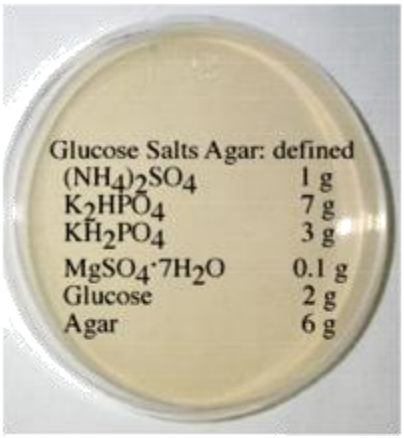


Solid: Agar

Liquid: Nutrient broth

C. Selective vs. Differential
   1. "Selective" means that the medium can _____ by _____ the growth of others.
   2. Differential media are designed to tell us the _____growing on the same culture medium. These media generally contain some kind of chemical that is altered in a visible way by some bacteria, but not others.

Example of a defined medium: Glucose Salt Agar (GSA)



An organism that is capable of growing on GSA must be able to _____ _____using only _____ _____ provided.

Example of a complex medium: Trypticase Soy Agar (TSA)

Because TSA is made using extracts of _____, it contains complex growth factors (e.g. _____, _____). Thus, organisms that are _____ _____ from the major elements can grow on TSA.

Example of a differential and selective medium: Eosin Methylene Blue (EMB)

The _____ dyes select for the growth of Gram-negative organisms. Organisms capable of fermenting _____ form dark purple colonies that sometimes have a metallic sheen.

IV. Classifications of organisms

A. Depending on an organism's _____ sources, it can be classified as follows:

A. **Photoautotrophs**

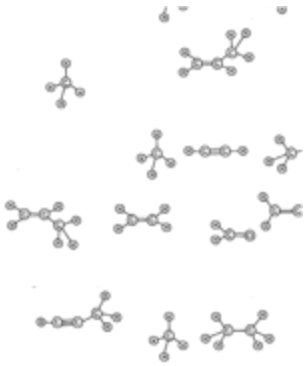
Energy: Inorganic sources
Carbon source: CO_2

B. **Chemoautotrophs (chemolithoautotrophs)**

Energy: Inorganic sources
Carbon source: CO_2

C. **Photoheterotrophs**

Energy: Light
Carbon source: Organics



D. **Chemoheterotrophs (chemoorganoheterotrophs)**

Energy: Organic sources
Carbon source: Organics