

Tishk International University  
Faculty of Applied Science  
Nutrition and Dietetics Department



# Culture Media Preparation

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Food Microbiology /2<sup>nd</sup> Lab  
2<sup>nd</sup> Grade / Spring Semester

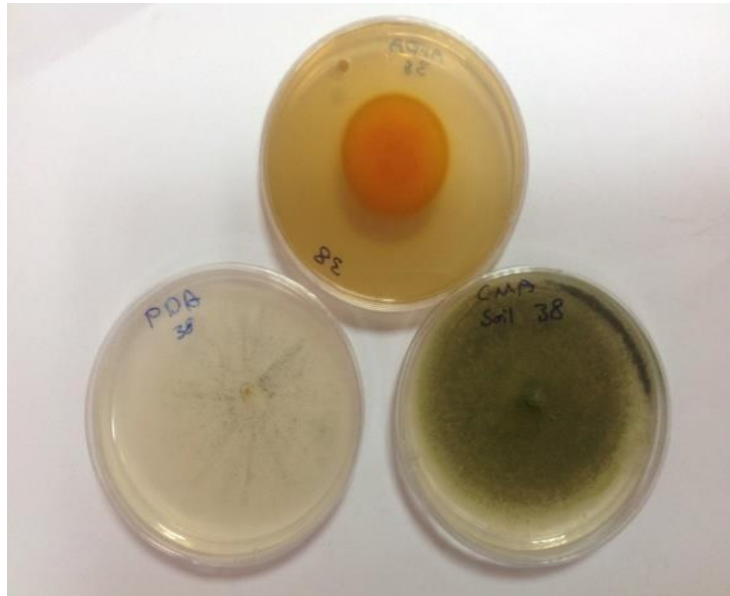
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# Culture medium

Media are artificially prepared substrates on which fungi and other microorganisms can grow or cultured



# Microbial nutrition

**Macronutrients** : required in large quantities; play principal roles in cell structure & metabolism

- Proteins, Carbohydrates and lipids.

**Micronutrients or trace elements**: required in small amounts; involved in enzyme function & maintenance of protein structure

- manganese, zinc, nickel

# Composition of culture media

- ❖ Carbon and Energy source
- ❖ Nitrogen source
- ❖ Mineral salts
- ❖ Special growth factors
- ❖ Water

# REQUIREMENTS FOR GROWTH

## Physical

- Temperature
- Osmotic pressure

## Chemical

### ❖PH:

- ❖ Acid-tolerant (pH 2.0)
- ❖ Strongly alkaline environment (pH 10-11)

# Fungal Media

- Media containing high **carbohydrate** source.
- There are two general types of fungal culture media:
  - Natural
  - Synthetic

# A- Natural Media

- ❖ Are composed of natural substrates, such as herbaceous or woody stems, seeds, leaves, corn meal, wheat germ, and oatmeal etc.
- ❖ Natural media are usually easy to prepare but they have the disadvantage of their **unknown composition**.
- ❖ Some examples:
  - ❖ Corn meal agar
  - ❖ Potato dextrose agar
  - ❖ V-8 juice agar
  - ❖ Dung agar.

## B- Synthetic Media

- ❖ Contain ingredients of known composition.
- ❖ These types of media can be duplicated with precision each time they are made and contain defined amounts of carbohydrates, nitrogen, and vitamin sources.
- ❖ Such as
  - ❖ Czapek-Dox medium
  - ❖ Glucose-asparagine medium
  - ❖ Neurospora crassa minimal medium.

# According to the purpose of use

## General purpose media

Which are commonly used for fungal culture

Potato Dextrose agar (PDA)

Sabouraud dextrose agar (SDA)

## Differential medium

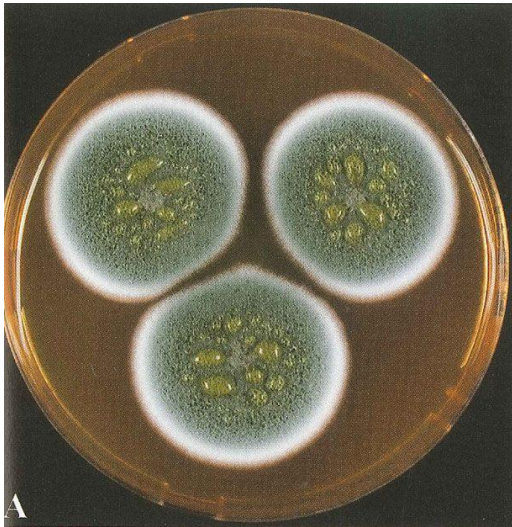
- Agar supplemented by rice, casein, and other nutrients like Cornmeal agar with Tween 80 have been used to differentiate **Candida** species and **Trichophyton** species.

# Selective media

- which contains Inhibitory mold agar and Dermatophyte test media are important in the isolation of fungal pathogens such as **Cryptococcus neoformans** and **dermatophytes**
- The inhibitory substance is added to a solid media to inhibit commensal or contaminating bacteria such as :
  - **Antibiotics**
  - **Dyes**
  - **Chemicals**
  - **Alteration of pH**

# Classification based on physical state

Solid medium



Semi solid medium



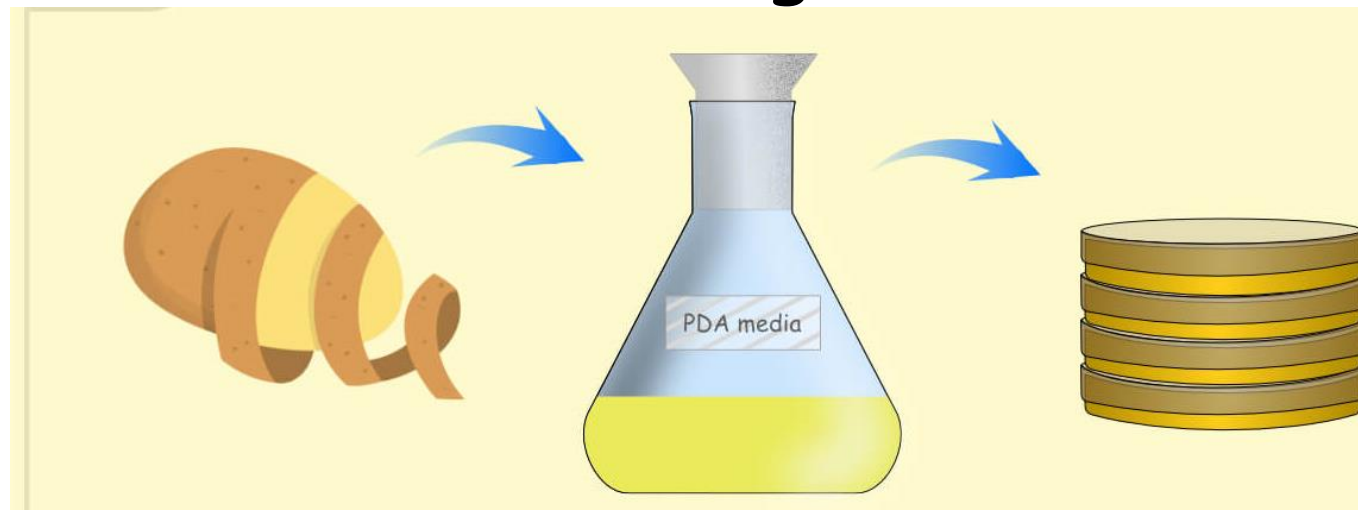
Liquid medium



# Some types of Media use in culturing fungi

## Potato Dextrose Agar (PDA):

- Potato Dextrose Agar (PDA) is a **general purpose medium** for yeasts and molds that can be supplemented with **acid** or **antibiotics** to inhibit bacterial growth.



# Preparing naturally

- To prepare potato infusion, boil 200 g sliced, unpeeled potatoes in 1 liter distilled water for 30 min.
- Filter through cheesecloth, saving effluent, which is potato infusion (or use commercial dehydrated form).
- Mix with Dextrose, Agar and Water and boil to dissolve.
- Autoclave 15 min at 121°C.
- Dispense 20-25 ml portions into sterile 15 × 100 mm petri dishes.
- Final pH, 5.6 ± 0.2.

# Brain-heart infusion (BHI) agar

- It is a non-selective fungal culture medium that permits the growth of virtually all **clinically** relevant fungi.
- It is used for the primary recovery of **saprophytic** and **dimorphic** fungi.

# Sabouraud Dextrose Agar (SDA):

- It is the standard medium for recovery and maintenance of a wide variety of fungi commonly isolated in the **clinical** laboratory.
- is a selective medium primarily used for the isolation of **dermatophytes**, other fungi and yeasts but can also grow filamentous bacteria such as **Nocardia**.
- The acidic pH of this medium (pH about 5.0) and **antibiotics** inhibits the growth of bacteria but permits the growth of yeasts and most filamentous fungi.

## Corn Meal Agar (CMA):

- Use for growing a wide range of fungi, particularly members of the **imperfect** fungi.
- Provides a good balance of **mycelium** growth because it has less easily digestible **carbohydrate**.

## Water Agar (WA):

Cellulose destroying fungi and spoilage fungi retain their ability to produce cellulase when grown on a weak medium such as water agar with a piece of **sterile paper, wheat straw** placed on the agar surface.

# Lab work

- Add 39 gm of Commercial PDA Powder to 1 Liter of Distilled water.
- Boil while mixing to dissolve.
- Autoclave 15 min at 121°C.



**THANKS!**