

Introduction to Microscope &  
Identification of Starch Types

222 PHG

# Lab No. 1

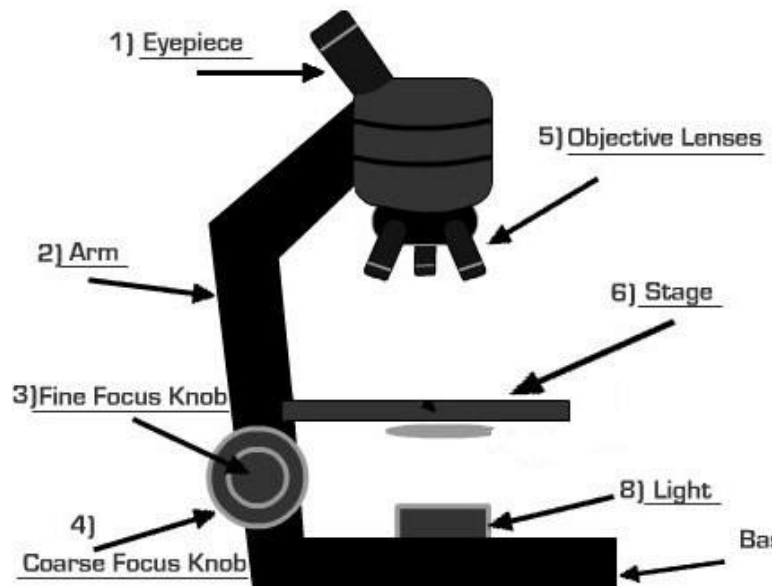




## Microscope

### Structure of microscope:

- **Eyeiece:** where you look through to see the image.
- **Body tube:** long tube that holds the eyepiece and connects it to the objectives
- **Nosepiece:** the rotating part of the microscope at the bottom of the body tube; it holds the objective lenses



- **Objective lenses:**
  - Low, medium, high & oil immersion
  - 2, 3 or more objectives
  - They vary in length (the shortest has the lowest power of magnification; the longest has the highest power of magnification).
- **Arm-part:** you carry the microscope with it.
- **Coarse adjustment knob**
  - large, round knob on the side of the microscope
  - used for focusing the slide
- **Fine adjustment knob:** small, round knob on the side of the microscope , used to fine-tune the focus after using the coarse adjustment knob
- **Stage:**
  - large, flat area under the objectives
  - it has a hole that allows light through
- **Light source:** usually found near the base of microscope



## Starch

Starch is a polysaccharide that occurs in granules of different sizes & shapes. Almost found in all organs of plants (roots, rhizomes, fruits & seeds)

### A) Physical properties:

#### 1- Solubility:

- § Cold water → suspension
- § Hot water → gelatinization
- § Organic solvents (  $\text{CHCl}_3$ , petroleum ether, benzene) → insoluble
- § Chloral hydrate → soluble

#### 2- Reaction with iodine:

- §  $\text{I}_2$  + starch solution --- Cold → blue color
- Evaporate → white starch (blue color disappears) due to iodine sublimation
- § Not a chemical reaction

### B) Chemical properties:

#### 1- Fehling Solution:

- § Fehling solution + monosaccharide → +ve test
- § Starch (being a polysaccharide) doesn't reduce Fehling solution → -ve test
- § However, after hydrolysis of starch → +ve test with Fehling

#### **Procedure:**

- § Hydrolysis of starch by dil. Acid (30 min on water bath)
- § Neutralization by dil. NaOH then alkalization by excess of NaOH. This is because Fehling solution works in alkaline medium.
- § Add equal volumes of Fehling A & B + starch solution –W.B. 15 min → any change in color is considered a +ve test

#### 2- Molisch's test:

- § Gives positive results with any compound containing a sugar part
- § Starch solution + alcoholic  $\alpha$  naphthol → conc.  $\text{H}_2\text{SO}_4$  drop by drop on wall → violet ring



### C) Microscopical examination:

All types of starch have the same physical & chemical properties but under microscope the granules have different sizes and shapes

	Potato	Wheat	Maize	Rice
<b>Shape</b>	Oval & pyramidal	Rounded, oval Lenticular in side view	Polyhedral with blunt angles	Polyhedral with sharp angles
<b>Hilum</b>	Eccentric pointed	Faint centric point, Linear in side view	Cleft or fissured, centric	Not present
<b>Striation</b>	Present, concentric	Faint	Not present	Not present
<b>Aggregation</b>	Simple, semi-compound & compound	Simple	Mostly simple	Mostly compound

