Laboratory Resources

Department of Botany

PANSKURA BANAMALI COLLEGE
(AUTONOMOUS)

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a. Laminar Air Flow

Key Characteristics:

- A laminar airflow system aims to reduce turbulence and maintain uniformity in the flow to reduce contamination.
- A laminar flow hood consists of a filter pad, a fan and a HEPA (High Efficiency Particulates Air) filter. which removes all airborne contamination to maintain sterile conditions.
- Working platform and Chanber for aspetic culture with UV C light
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b. Autoclave

● **Pressure Cooker Type/Laboratory Bench Autoclaves (N-type)**: This autoclave is commonly used around the world for moist heat sterilization. Autoclaves typically yield a temperature of about 121 degrees Celsius at 15 pound/squre inch pressure taking about 15-20 minutes to complete the sterilisation process.

● It contains an air and steam discharge tap, a safety valve, and a pressure gauge. It also contains an electric immersion heater located at the bottom of the chamber.

● Place the instruments inside the chamber. Close the lid and tighten the screws then switch on the electric heater for sterilization of glassgoods and instruments

c. Hot Air Oven

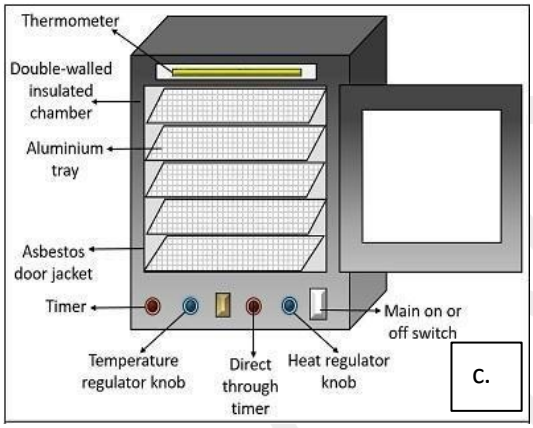
A hot air oven is a type of **dry heat sterilization** that works on the principle of **heat conduction**, in which the articles are sterilized layer by layer, starting from the surface towards the centre. In this system, dry heat is recirculated within a chamber at a temperature ranging between 50-300 ºC to sterilize **thermally stable objects**. A hot air oven makes the use of dry heat to **oxidize** the **cellular components** of the microorganisms and their spores to kill them.

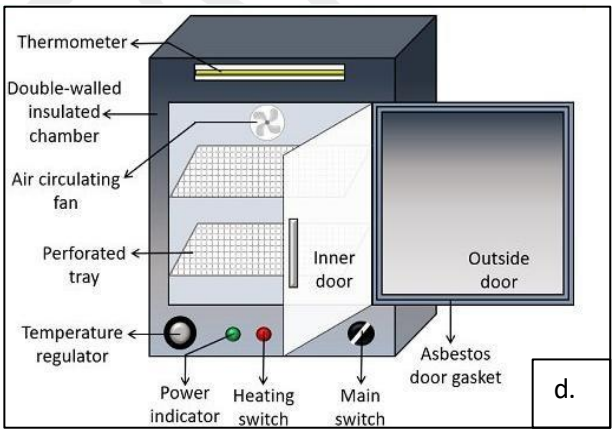
1. Exterior Components

- **Main switch**, **Temperature regulator**, **Thermostat** and **Asbestos door jacket**:

2. Interior Components

- **Inner chamber**, **Temperature sensor**, **Air vents**, **Aluminium trays**, **Circulating fans and Heating element**





d. Bacteriological incubator

The working of a bacteriological incubator depends upon **thermo-electricity**. A thermostat at the incubator's top regulates a desirable temperature within the chamber.

The bacteriological incubators work by using a heating system only. Due to this reason, we call such incubators "**heated incubators**".

The term "**Bacteriological incubator**" itself clears that it only incubates bacteria.

- It maintains a desirable temperature range of 10°C above ambient to 60°C.
- Most bacteria grow best at a temperature of 37 °C.

The bacterial growth within the bacteriological incubator is **independent** of the **external environment**. In general, the incubator utilizes heating and no-heating cycle.

It is almost like hot air oven.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HOT AIR OVEN
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e. -20 C deep freezer

Deep freezers are the testing equipment that are used **to preserve and store food products, medical equipment, blood samples, medicines and injections, etc**. for a long period of time. Deep Freezers are used for industrial purposes as well as for household purposes.
In **chest type deep freezer the door is opening horizontally.**

f. Orbital Shaker

- An orbital shaker works by generating a circular shaking motion at a slow speed of 25-500 rpm.
- The shaker contains an oscillating board with spring attached clips.
- The holder that hold the vessels as the device shakes to blend, agitate, or mix the substances in the vessels.




g. Laboratory Hot Plate

laboratory hot plates in both rectangular and round shapes with surface temperature range up to 350°C and optional 500°C. Heating surface is made of either MS, Stainless Steel or Cast Iron. Temperature is controlled through energy regulator or digital PID controller which efficiently controls temperature and also displays set value and process value.

H. Cyclomixers / Vortex mixers

- Designed for mixing liquids in Laboratories
- Speed Regulation through knob provided on the control panel
- Interchangeable mixing heads for use with variety of tubes
- Touch/ Continuous Operation mode Selection through bi-directional Switch

I. CENTRIFUGE

- Remi R-8C Laboratory Centrifuge with 6x50ml Angle Rotor Head is a premium quality product from Remi. Moglix is a well-known ecommerce platform for qualitative range of Centrifuges. All Remi R-8C Laboratory Centrifuge with 6x50ml Angle Rotor Head are manufactured by using quality assured material and advanced techniques, which make them up to the standard in this highly challenging field. The materials utilized to manufacture Remi R-8C Laboratory Centrifuge with 6x50ml Angle Rotor Head, are sourced from the most reliable and official vendors, chosen after performing detailed market surveys. Remi products are widely acknowledged in the market for their high quality.

- Electronic balance
- Ph meter
- Hot Water bath

An ultra-violet (UV) transilluminator is a standard piece of equipment used in life science laboratories for **visualization of target DNAs and proteins**. The UV transilluminator works by emitting high levels of UV radiation through the viewing surface.

Why is UV light used in DNA electrophoresis?

It is used because **upon binding of the molecule to the DNA and illumination with a UV light source, the DNA banding pattern can be visualized**.


Parallel
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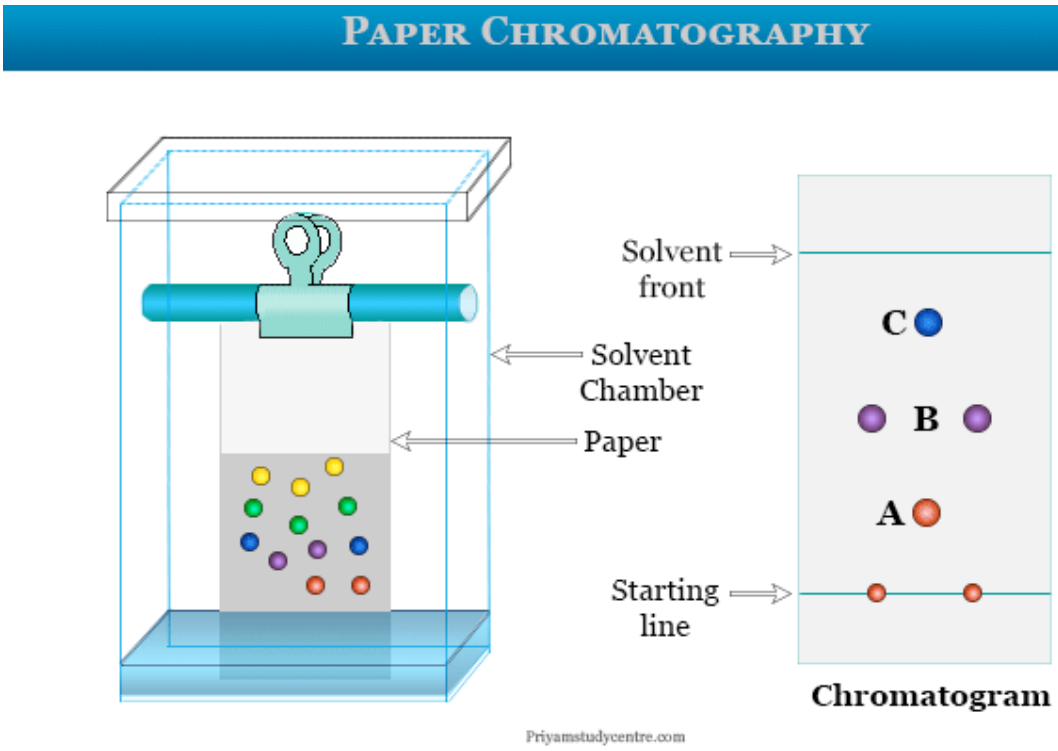
- 

Procedure

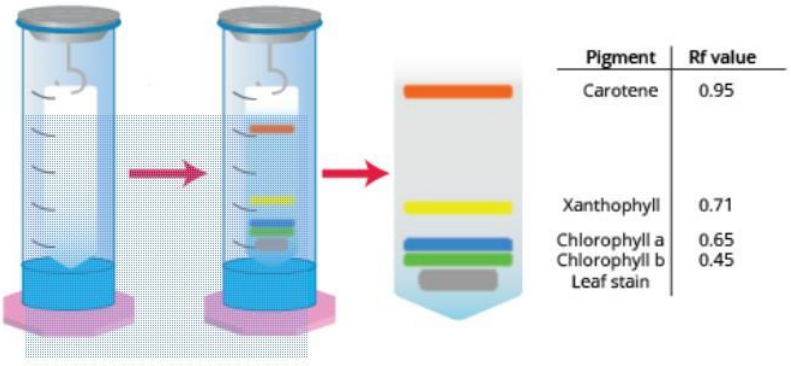
- In this experiment, spinach leaves are used to separate different pigments.
- Pick a few fresh and green leaves of spinach and wash it.
- Cut out small pieces of spinach using scissors. Add them to the mortar.
- Accurately measure 5ml acetone using a measuring cylinder and add it into the mortar.
- With the help of mortar and pestle, grind the spinach leaves into a smooth paste.
- Shift the prepared paste of spinach into the watch glass with the help of a spatula.
- Place a filter paper strip with a tapering notch towards one ending of the strip.
- Horizontally trace a line with a scale and a pencil that is 2 to 3 cm apart from the notch's tip.
- Using a capillary tube, add 1 drop of the extract of the pigment in the midsection of the line.
- Let the drop dry. Repeat the same process of adding a drop and allowing it to dry for 4-5 times.
- In the chromatographic chamber, pour the ether acetone solvent.
- Make sure to folded and stapled an end side of the paper.

- Suspend the strip in the chamber.
- The loading spot remains about 1 cm above the level of the solvent.
- Let the chamber remain uninterrupted for a while.
- We can notice that the solvent passes along the paper scattering various pigments of the blend to different distances.
- Once the solvent reaches 3/4th of the strip, carefully take the strip off.
- Allow the strip to dry.

Observation/ Result

The dried paper strip displays four different bands. Discrete pigments can be distinguished with the help of colours.

The pigment's movement rate is measured by the Rf (retention factor) value. Rf value = distance transported by pigment from origin to centre of pigment spot/distance from the origin to the solvent front. By applying this formula, you can determine the Rf value.



Conclusion

1. The Carotene pigment is observed at the topmost as an orange-yellow band of pigments distinctively.
2. Just below this band, a yellowish band appears which indicates the pigment xanthophyll.
3. The third band appearing dark green/blue indicates chlorophyll-a pigment.
4. The yellowish-green band present at the bottom is the chlorophyll b pigment.

Exp 2: Experiment on amino acids

A paper chromatography experiment is used for the identification or separation of individual amino acids from a mixture of amino acids.

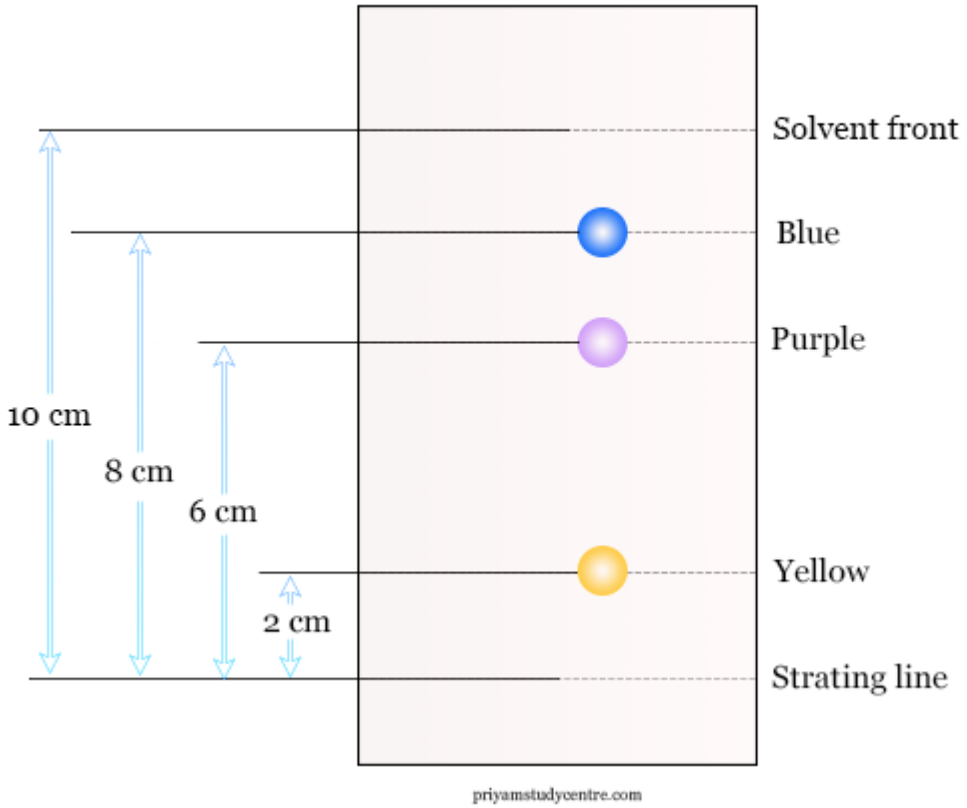
Material required in paper chromatography

- Whatman filter paper strip.
- A mixture of unknown amino acids is dissolved in 10 ml of water.
- Solution of glycine: 5 mg of glycine in 1 ml of water.
- Ninhydrin spray: 200 mg of ninhydrin is dissolved in 99 ml of n-butanol and 1 ml of acetic acid.
- Solvent: n-butanol, acetic acid, and water = 80ml, 20 ml, and 100ml.

Paper chromatography procedure

A line parallel to the short end of the chromatography paper sheet is drowned by a pencil about 10 cm apart. Two points are marked on the Whatman filter paper strip.

The mixture of amino acids is spotted on one mark with no more than 5 mm diameter. Similarly, the second mark is spotted by the standard solution of glycine. The spot is allowed to dry.



The developing solvent is placed in a clean dry glass chamber of a paper chromatographic instrument. The glass chamber is covered with a glass plate having a hole in the middle.

The paper strip hangs from a wire hook dipped into the solution where the spots are just above the solvent front. The solvent rises owing to capillary action on the paper strip. When it almost reaches the point of suspension from the wire hook, the paper strip is carefully taken out from the chamber.

Paper chromatography experiment result

The position of the solvent front on the paper strip is marked. The paper strip is allowed to dry and the ninhydrin reagent is spread lightly but uniformly. The strip is then heated in an oven at 105 °C for five minutes and the position of the spots is marked.

1. The yellow spot is identified as proline.
2. The spot which moves parallel to the spot of glycine is identified as glycine.
3. The other blush purple spot is phenyl aniline.

Comments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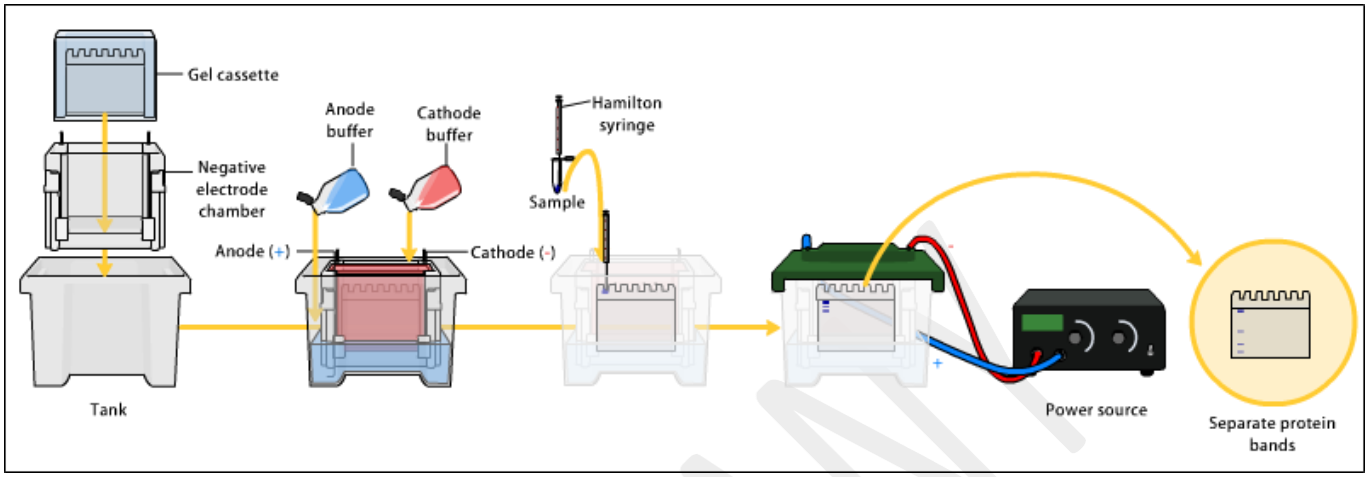
PHMETER

SDS-PAGE Set Up:



UV-Vis Spectrophotometer (Double Beam)