NEATH PORT TALBOT COLLEGE
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School of Maths & Science
Science Practical

Mitosis in Hyacinth / Garlic root tip cells using Acetic Orcein stain

◆ Aim

To see chromosomes and to observe stages in mitosis in plant cells.

◆ Introduction

If the chromosomes are selectively stained with a dye such as aceto-orcein, stages in mitosis can be observed in tissues where cell division occurs. An example of such a tissue is the meristematic tissue located in the zone of cell division, in the tip of a growing root.

◆ Safety

Control Measures

- The wearing of safety glasses and a laboratory coat at all times will be sufficient to take account of most hazards and significant risks.
- Avoid contact with aceto-orcein stain and concentrated hydrochloric acid.
- Avoid inhalation of fumes during the heating phase by ensuring good ventilation provision.
- You are reminded of the need for good laboratory practice in order to maintain a safe working environment.

Hazards

Corrosive — Concentrated Hydrochloric acid
Aceto-orcein stain

◆ Procedure

1. Set up a steam bath by heating about 200cm^3 of water in a 250cm^3 beaker.

2. Using fine forceps, remove an intact root from the rooting hyacinth / garlic, and lay it on a microscope slide. Use scissors to cut off 1 - 0.5cm of the extreme tip of the root and then transfer it to a watch glass.

3. Add 30 drops of aceto-orcein stain, and three drops of concentrated hydrochloric acid (Corrosive) to help macerate the tissue. As the steam bath reaches boiling, turn off the Bunsen and sit the watch glass on top of the beaker.

4. Leave it there for 3 minutes, taking care the stain does not evaporate away (top up with stain, if necessary). Turn the root tip to ensure even staining and complete maceration.

5. When 3 minutes is up, transfer the root tip to a microscope slide. Tease apart the cells of the root tip with mounted needles. Then add a drop of cold stain, and cover with a coverslip. Fold two or three filter discs into a pad and apply it to the coverslip. Press firmly with the thumbs to squash the root-tip tissue.

6. Now examine your preparation. Ideally you will see red-purple nuclei and almost colourless cytoplasm. Identify and draw cells in interphase and in different stages of mitosis.

7. Examine a prepared slide of Hyacinth / Garlic root tip and draw a plan diagram to indicate the zone of cell division i.e. where the stages of mitosis can be seen.