EXPERIMENT 1

Aim

To study and calculate the percentage of pollen germination on a slide.

THEORY/PRINCIPLE

Pollen Grains

Pollen grains are male reproductive structures of an angiospermic flower which contain male gametes. Each pollen grain consists of a mass of protoplast surrounded by a thick double-layered wall. The protoplasm also contains a single haploid nucleus, which divides to form two nuclei, i.e. the tube nucleus and the generative nucleus. The outer wall of pollen or **exine**, is usually thick, cuticularised and smooth but may be thin at certain places. These thin regions are termed as **germ pores**. The inner layer of wall or **intine** is thin with cellulose and pectin as its chief constituents. It is hydrophilic in nature and can easily absorb water and swell.

Pollen Grain Germination

In nature, pollen grains germinate on the compatible stigma of the carpel. This process is called **pollen-pistil interaction**. It is known to be an essential step in fertilisation of angiosperms which determines the compatibility and incompatibility of both pollen and pistil. This dynamic process involves pollen recognition followed by inhibition or promotion of pollen germination. The pollen grains can be induced to germinate in a synthetic medium using chemicals which favour pollen germination such as 10% sucrose solution that facilitates rapid growth of pollen tubes.

During germination, intine (inner wall) of pollen grain emerges out as pollen tube through one of the germ pores in exine (outer wall) and the pollen tube grows into the genetically compatible stigma only. Out of two male gametes carried in the pollen tube, one fuses with the egg cell while, the other fuses with the secondary nucleus. This process is known as **double fertilisation**, which is a characteristic feature of all angiosperms.

The pollen of different flowers might differ in their germination time and length of the pollen tubes. They also show different **sculpturing** on their pollen wall.

REQUIREMENTS

Mature pollens of any seasonal flower like *Tradescantia*, jasmine, lily, etc., cavity glass slides, coverslips, microscope, distilled water, beaker, weighing machine, filter paper, glass rod, boric acid, sucrose, calcium nitrate, brushes and dropper.