EXPERIMENT

AIM

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

MATERIAL REQUIRED

Different types of flowers like Petunia, Catharanthus (sadabahar), Hibiscus, Portulaca (Kulfa ka sag), Impatiens (Balsam), grass; slides, coverslip, microscope, water, beaker, weighing machine, filter paper, glass rod, boric acid, sucrose, potassium nitrate, magnesium sulphate.

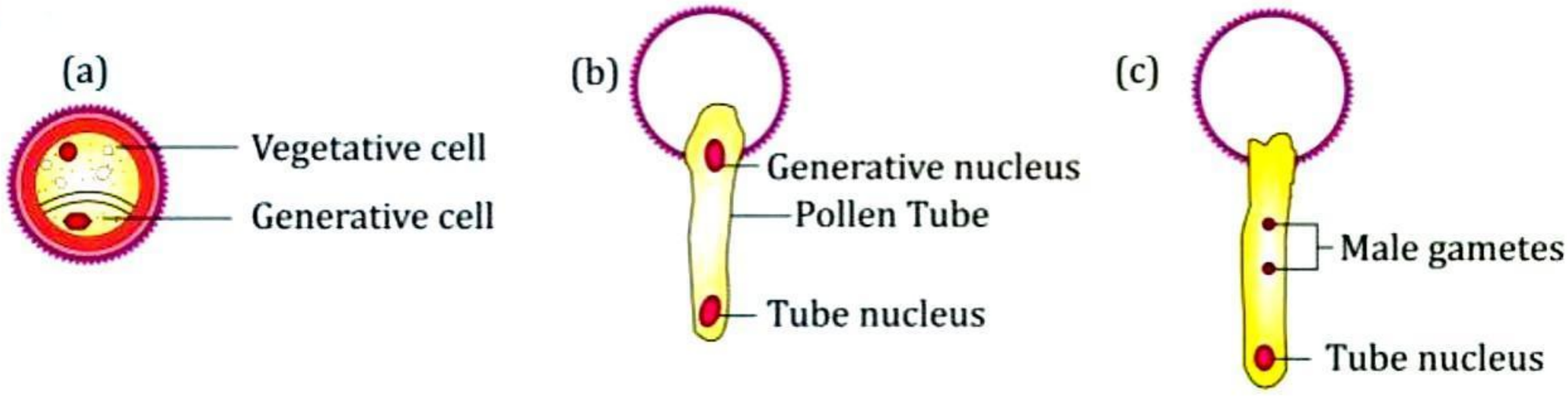
THEORY

Pollen is a powdery substance consisting of pollen grains which are micro sporophytes of seed plants, which produce male gametes (sperm cells). Pollen itself is not the male gamete. Each pollen grain contains vegetative (non-reproductive) cells (only a single cell in most flowering plants but several in other seed plants) and a generative (reproductive) cell. In flowering plants the vegetative tube cell produces the pollen tube, and the generative cell divides to form the two sperm nuclei.

Pollen is infrequently used as food and food supplement. Because of agricultural practices, it is often contaminated by agricultural pesticides.

PROCEDURE

1. Prepare a nutrient solution by dissolving 10 g sucrose, 10 g boric acid, 50 mg potassium nitrate and 50 mg magnesium sulphate in 50 ml water.
2. Dust the pollen from a flower over a slide.
3. Put 2-3 drops of nutrient solution over the pollen grains and mix the contents with a needle.
4. Put the coverslip over it gently and leave it for 10 minutes.
5. Observe it under the microscope to see the pollen germination and pollen tube growth.
6. If no pollen germination is seen, wait for another 10 - 20 minutes and then observe under the microscope.
7. Repeat the steps with flowers of other plants and record the time required for pollen germination.



OBSERVATIONS

Pollen grains of different plant species. show different types of sculpturing on the exine. Rate of pollen germination and viability also varies for different species.

S.No.	Name of the flower	No. of pollen showing germination (a)	Total no. of pollen (b)	% of pollen germination $= \frac{a}{b} \times 100$	Time taken for germination of pollen

CALCULATION

Percentage of pollen germination $= \frac{a}{b} \times 100$ or $\frac{100a}{b}$

where, a = Number of pollens showing germination, b = Total number of pollens

RESULT

All the pollens of different species in the medium germinate with different percentage. Also, there is great variation in time taken for the germination of pollen of each species.

PRECAUTIONS

1. Dust few pollen grains on the slide to avoid overlapping.
2. Label the slides properly for different flowers.
3. There should not be any air bubble under the coverslip.
4. Soak extra solution with filter paper.
5. Nutrient solution should be made carefully.

VIVA VOCE

Q1. What is a pollen grain?

Ans. It is the male gametophyte of angiospermic plants and gymnosperms.

Q2. How many nuclei are present in the pollen tube?

Ans. There are three nuclei - one vegetative nucleus and two male gametes.

Q3. What are the constituents of the wall of pollen grain? Which layer grows out to form the pollen tube?

Ans. Pollen wall consists of exine and intine. Intine grows out to form the pollen tube.

Q4. How does the pollen tube break the hard sporopollonin of the exine?

Ans. The pollen tube is formed from the intine. The exine tube is very thin at one place from there the pollen comes out.

Q5. Where does the pollen germination take place in a flower?

Ans. It takes place on the stigma of a flower.