



AGRICULTURAL SCIENCES

TITLE: Seed Germination Tests, by Gail Dahlquist, U.S. Water Conservation Laboratory

SUBJECT: Science (Biology, Botany, and Mathematics)

GRADE LEVEL: 5-12

MATERIAL(S):

Latex or vinyl gloves

150 seeds (can use popcorn, any variety)

6 petri dish sets (tops and bottoms) -- 100 x 15 mm is suggested

Filter paper or circles of clean paper toweling

Distilled water

Parafilm

Data sheets

OBJECTIVE(S): To demonstrate the effect that different parameters (such as temperature, light and water) have on seed viability

TIME NEEDED: Observing the seeds should take only a few minutes each day. The total experiment should not run longer than 10 days.

OVERVIEW:

Background

Different types of seeds have different shelf lives. If seeds are stored for an extended period of time, germination tests can be performed to determine if the seeds are viable before they are planted.

Running a simple seed germination test on a sample population of seeds is a good way to estimate the percentage of total seeds that will germinate in the field.

Procedures

Make sure you wear latex gloves before you start the experiment to avoid contaminating seeds with oils and fungus. Line the bottom petri dish with filter paper or paper towel. Scatter 25 seeds on the paper in each dish. Wet the seeds and filter paper with distilled water. Put the cover on the petri dishes. Wrap a strip of parafilm around the edge of the petri dish to prevent evaporation. Label top of petri dish with date and treatment type.

Observe the seeds every day for germination. Germination has occurred when white radical (root) emerges from the seed. Count the number of germinated seeds in each dish every day. Record daily numbers on a prepared data sheet. All viable seeds should have germinated within 10 days. At the end of the test, determine the total number of seeds that have germinated. Divide this number by 150 to determine the percentage of seed germination.

Additional Exercises

The procedure calls for six different petri dishes. The seeds in these different dishes can be exposed to different environmental conditions to determine how these different conditions affect seed germination. The seeds can be exposed to different intensities of light, different temperatures, and different amounts of water. Also, fertilizer can be added to the water. The results of these tests would determine the optimal environmental conditions for the seeds to germinate. The test can also be performed on a second variety of seeds. This would demonstrate if the second variety of seeds optimally germinates under the same environmental conditions as the first variety of seeds.

Discussion Questions

Why didn't all of the seeds in an individual petri dish germinate when they were all treated the same?

Where did the fungus on some of the seeds come from?

Why did you add water to the dish?

Notes

Gloves are worn to prevent the spread of fungus to the seeds. Fungus is common in germination tests. The fungus will not prevent germination, but it will hamper the growth of the plant from the germinated seeds. If the top of the petri dish is too wet with condensation, remove the parafilm and wipe the inside of the petri dish with a clean paper towel. Replace the lid and parafilm.

Sample Seed Germination Data Sheet

Fill in the blanks with the total number of seeds germinated on a given day.

Sample	Treatment Type	Day Number									
		1	2	3	4	5	6	7	8	9	10
A	Light										
B	Dark										
C	Hot										
D	Cold										
E	Little Water										
F	Lots of Water										