

Seed germination

I) Aim:

To investigate the following factors affecting seed germination (warmth, water, light, air)

II) Hypothesis:

The seeds with all the factors will be the best developed. I think the grains without water, air and warmth will not grow because seeds need water and warmth to be activated and they need oxygen to develop. The seeds without light will grow but it will not have a green colour because the plants need light to make photosynthesis.

III) Variable:

Constant: cotton wall, surface area of the boiling tube, water, light, air.

Independent variable: warmth

Dependent variable: seeds germination






IV) Laboratory apparatus:

- 5 Boiling tubes to put the seeds in a special environment with different factors (no warmth (1), no water (2), no light (3), no air(4), Control (5))
- Boiling tube rack: to hold the boiling tube while we are preparing the experiment

V) Method:

We put five boiling tube in a boiling tube rack. In the five boiling tube we put a cotton wall at the bottom with 10 seeds on it. Then we take one of the boiling that we put aside. This boiling tube will be the case with no water. We take the four left and we put the same amount of water in them. Then we take three of them to be the cases with no light, no warmth and the control. With the last one we put oil in it to be the case with no air. Then we take the boiling tube that has to be the case with no light and put it in a dark cupboard. We take the boiling that has to be the case with no warmth and we put it in a fridge.

VI) Results table: “The factors affecting seeds germination”

Independent Variable	Germination	Colour	Image	Height (cm)	Amount of seed germinated (/10)	Other observations
Control	Yes	Green		2.5	6	
No warmth	No					The seeds are cold
No water	No					The seeds are dry
No light	Yes	Leaves are yellow and the pedicel is white		6	7	
No air	No					The seeds were wrapped up in a kind of “bubble” of oil.

VII) Conclusion:

To germinate a seed needs at least these three factors: water, warmth and air. It needs water and warmth to be activated and air to have oxygen which is essential for aerobic respiration. The aerobic respiration is needed for the development of the plants because it is the main source of energy until the leaves grow. A seed needs light because the leaves make energy from light by photosynthesis. The photosynthesis makes the green colour of the plant and converts carbon dioxide to sugar or other organic compounds to make energy. So a seed needs warmth, water, air and light to develop correctly.

**VIII) Evaluation:**

Weakness and errors in the procedure	Suggestion to improve
The case of the control, the light is an artificial light.	To redo the experiment with the boiling tube near a windows without artificial light.
In the case with no light, the cupboard was not totally dark.	To redo the experiment with the boiling tube in a totally dark environment
In the case with no warmth, the fridge was cut during 48 h	To redo the experiment without cutting the fridge.
We tried with one kind of seed.	We have to try with other kind of seed.