

Puspa Shrestha

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EXPERIMENT NO. 1

NAME OF EXPERIMENT: DEMONSTRATION OF THE PROCESS OF OSMOSIS BY POTATO OSMOSCOPE METHOD.

APPARATUS REQUIRED

1. A petri-dish
2. A large potato.
3. Knife.
4. Pins
5. Scalpel.

CHEMICALS REQUIRED

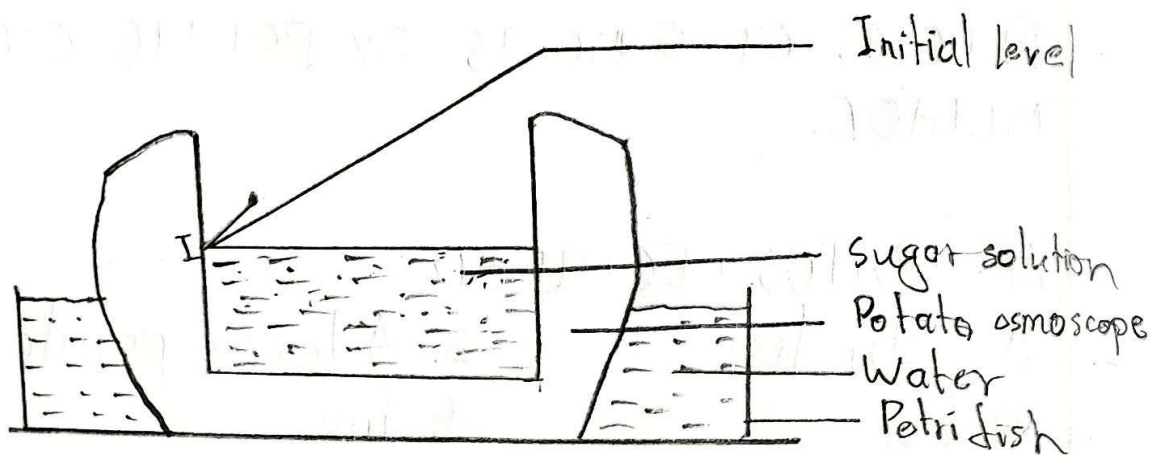
1. Sugar solution (20%)
2. Water.

THEORY

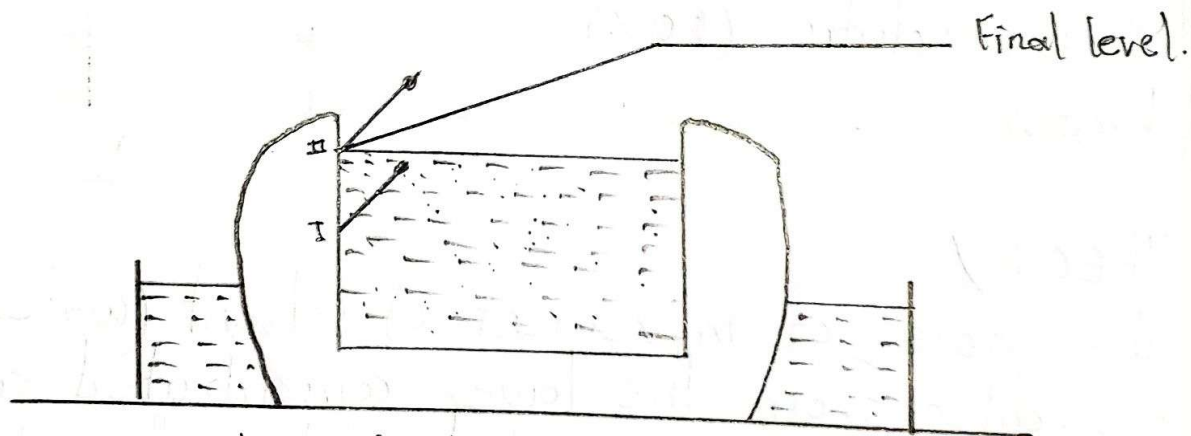
The process of movement of solvent (water) molecules from the lower concentrated solution to the higher concentrated solution through a semipermeable membrane is called osmosis.

The process of osmosis continues in between solvent and its solution until the hydrostatic pressure becomes equal to the osmotic pressure of the solution. It is of two types:

- i) Exosmosis
- ii) Endosmosis.



At the Beginning of the Experiment



At the End of the Experiment

PROCEDURE

A large size potato tuber was taken and its skin was peeled out. Its one side was cut with the help of a knife to make its base flat. Then, a hollow cavity was made from another side of the potato by scooping the flesh of the potato using a scalpel, so that a very thin base was left intact. After that, the potato osmoscope was kept in the Petri dish containing water just enough to dip a half portion of the potato osmoscope. Sugar solution (20%) was poured up to half of the cavity of the potato osmoscope and its initial level was marked with the help of a pin. The whole setup was left undisturbed for few hours.

OBSERVATION

After few hours, it was observed that the level of sugar solution in the potato osmoscope had risen. The final level was marked with the help of the next pin.

RESULT AND CONCLUSION

The rise in the level of sugar solution in the potato is due to the entry of water from Petri dish, through the potato cells, to the solution.

Thus, the potato cells act as semipermeable membrane and this movement of water molecules from their region of higher concentration (water of Petri dish) to the region of lower concentration (sugar solution) through semipermeable membrane (potato cells) is called osmosis.

PRECAUTIONS

1. The skin of the potato should be peeled out properly.
2. The thin layer of potato between flat base and cavity should remain unruptured.
3. The cavity wall should be as thin as possible.
4. The sugar solution should have a higher concentration than the cell sap of potato cells.
5. The pins should be fixed very carefully.

EXPERIMENT NO. 2

NAME OF EXPERIMENT: TO DEMONSTRATE THE PROCESS OF TRANSPIRATION BY BELL JAR METHOD.

APPARATUS REQUIRED

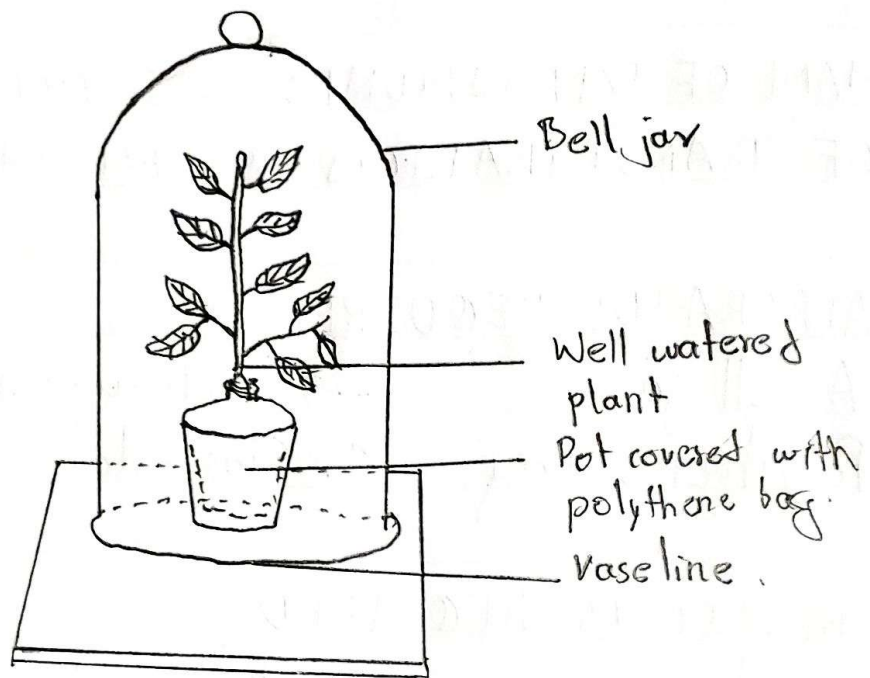
1. A bell jar
2. A well-watered potted plant
3. Polythene bag
4. Glass-slab.
5. Thread.

CHEMICALS REQUIRED

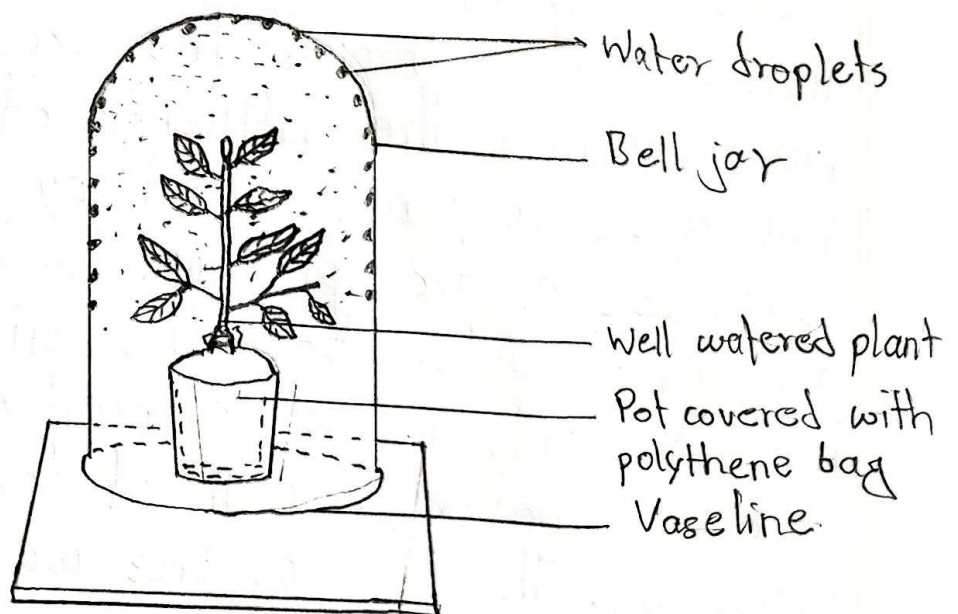
1. Vaseline
2. Water

THEORY

The process of the loss of water in the form of water vapour from the internal tissues of the living plants through the exposed parts of the plants, under the influence of sunlight and regulated to some extent by protoplasm is regarded as transpiration. Plants absorb a large amount of water from the soil through the root hair but only a small amount about 1-2% of total absorbed water, is utilized for different metabolic activities. The rest of the water is lost in the form of vapour during transpiration.



At the Beginning of the Experiment



At the End of the Experiment

PROCEDURE

First of all, a healthy and well watered potted plant was selected. The pot was covered with along with the soil with a polythene bag to prevent evaporation through these parts (soil and pot). The polythene bag was tied tightly with the help of a strong thread. Then, the whole apparatus was kept on a glass slab and it was covered with a dry bell jar. The connection was made between bell jar and glass slab airtight by applying vaseline to check the entry of water vapour from outside. Then, the whole setup was kept in light.

OBSERVATION

After some time, it was observed that there was the formation of water droplets on the inner side of the bell jar.

RESULT AND CONCLUSION

As the bell jar is properly sealed and the pot and soil are covered with water proof polythene bag, the water evaporated gets collected inside the polythene bag and cannot come out into the ~~the~~ chamber of the bell jar. Hence, the water droplets formed on the inner side of the

bell jar are due to condensation of water vapour lost by the aerial part of the plant when they come in contact with the cool surface of bell jar. This process of loss of water in the form of vapour through the aerial parts of the plant body is called transpiration.

PRECAUTIONS

1. The potted plant should be well watered.
2. The polythene bag should be used properly.
3. The connection should be airtight.
4. The edge of the bell jar should be sealed properly.
5. The setup should be placed in light but not in direct sunlight.

EXPERIMENT NO. 3

NAME OF EXPERIMENT: TO DEMONSTRATE THE EVOLUTION OF CO_2 DURING AEROBIC RESPIRATION.

APPARATUS REQUIRED.

1. A set of conical flask
2. Cork
3. Beaker
4. Test tube
5. Thread.

CHEMICALS REQUIRED

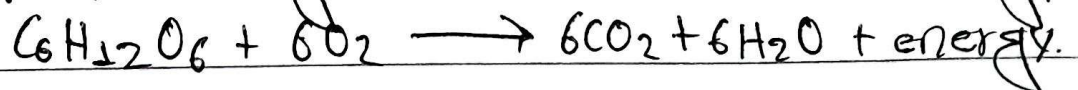
1. Potassium hydroxide
2. Vaseline.

MATERIAL REQUIRED

1. Germinating seeds.

THEORY

Aerobic respiration is a process of oxidation of organic substance in the living cells in presence of oxygen resulting the liberation of energy.



The germinating seeds metabolize the nutrients stored in seed. Oxygen is consumed in this process and stored nutrients are oxidised to carbon dioxide and water.

PROCEDURE

1. Some germinating gram seeds were kept in a conical flask.
2. A tube bent twice at right angle was taken and fit into a conical flask by means of cork tightly.
3. A small test tube containing KOH solⁿ was hang in the flask by means of a thread.
4. The free end of bent tube was dipped in a beaker containing water.
5. The cork joints was sealed by applying vaseline.
6. The whole experiment was left for few hours and observed.

OBSERVATION

After few hours of experiment it is observed that water rises up in the tube from the initial level.

CONCLUSION

Germinating seeds respire aerobically inside the flask and release CO_2 . The CO_2 observed by KOH a partial vacuum is created in the flask. The vacuum act as a suction pump and pulls the water up. It causes the rising of

of water level. It is observed only CO_2 gas. Therefore, the ~~evolution~~ evolved gas must be CO_2 .

PRECAUTIONS

1. The apparatus should be handled carefully
2. The seeds should be germinating.