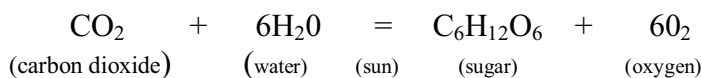


## STARCH TEST

AIM: To determine whether leaves contain starch.

INTRODUCTION: plants feed by photosynthesis. They use carbon dioxide from the air and water from the soil to make carbohydrates. This process requires an energy input which comes from the sunlight and is absorbed by the green pigment chlorophyll present in the chloroplasts. The carbohydrates formed as a product of photosynthesis can be made into other substances such as proteins by adding nitrate ions and it can also form chlorophyll by adding magnesium ions.

Photosynthesis occurs inside the mesophyll cells, especially the palisade cells and also the guard cells of the leaves. Leaves consist of chloroplasts which consist of chlorophyll which captures light energy. Photosynthesis occurs inside the chloroplasts. The word and molecular equation of photosynthesis is:



The sugar is the main form of energy made by the plant and is for the plant. This sugar is very essential for a plant's survival. It is made into starch by chloroplasts which is a good way of storing the sugar as it is insoluble in water unlike glucose (sugar).

HYPOTHESIS: If starch is present in the leaves then the leaf will turn blue black if iodine solution is put on it.

APPARATUS:

- 1) A variegated leaf (coleus, geranium and croton are examples).
- 2) A normal leaf.
- 3) Bunsen burner, tripod, gauze.
- 4) 250 cm<sup>3</sup> beaker
- 5) Test tube- borosil
- 6) Forceps or any other equipment for handling soft, wet leaves.
- 7) A white tile
- 8) Iodine solution
- 9) Dropper
- 10) Ethanol (covered with a watch glass as it is very volatile).

METHOD:

- 1) Take a variegated leaf from your garden, pluck it out.
- 2) Boil some water in a beaker.
- 3) When the water starts boiling put the leaf in the beaker.
- 4) Leave the leaf in the water for about 3 minutes.
- 5) Take out the leaf from the beaker with the forceps( and be careful as it is very soft)

- 6) Turn off the Bunsen burner.
- 7) Put the leaf on the tile.
- 8) Pour some ethanol in a boiling tube, filling it until it is half–full. Put the leaf in the ethanol, pushing it down gently. Stand the boiling tube in a beaker of hot water.
- 9) Leave the leaf in the ethanol until most of the green color comes out of the leaf.
- 10) Then, gently remove it from the ethanol using the forceps.
- 11) Dip the leaf into water to soften it.
- 12) Gently spread it out on a tile.
- 13) Put some iodine solution drop by drop using a dropper. Leave it for a few minutes (to give iodine time to penetrate the leaf cells).
- 14) Repeat the same procedure using a normal green leaf.

#### OBSERVATIONS:

On putting the iodine on the variegated leaf, only part of it stained black –blue , the parts which were initially green, and there was no starch detected on the areas on the leaf which were initially white , therefore on adding iodine solution they stained brown.

On putting the iodine on the normal leaf, the whole thing stained black-blue.

#### CONCLUSIONS:

The blue black color on the variegated leaf after adding the iodine solution was due to the presence of starch in the initially green areas which consisted of chloroplasts, and the areas that stained brown detected that starch was not present in the white areas of the variegated leaves due to absence of chloroplasts and hence chlorophyll, therefore starch was only produced in the areas which were green, which were the areas that photosynthesized.

The normal leaf, which was completely green turned black-blue throughout as it was completely green and photosynthesized throughout as the whole leaf consisted of chloroplasts hence chlorophyll.

#### EVALUATION:

Our results were decent however we could have made our experiment better by initially covering the leaf we wanted in our experiment to be covered with black paper and not to be plucked from the plant, and should have been left in sunny conditions for a few days.

Therefore our starch stains were not exactly black –blue and were slightly on the light side.