

Eisenberg – Energy and Metabolism

Detection of starch in potato

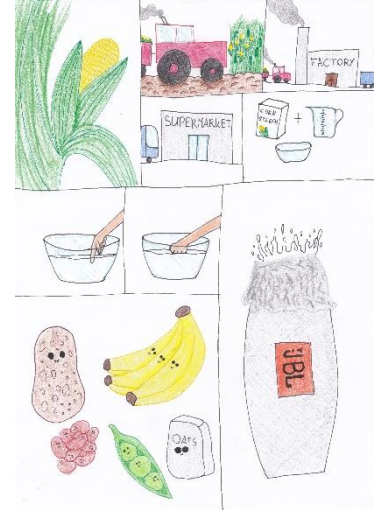
Required materials and equipment

1 % starch solution, 1 % sugar solution, Lugol's iodine, alcohol lamp, 5 test tubes, test tube rack, test tube holder, knife, distilled water, potato, microscope slide, microscope cover slip, light microscope, Pasteur-pipette, beaker, spatula, filter paper



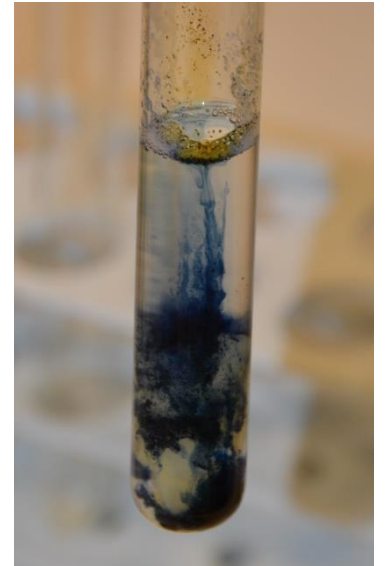
Experiment

- 1, We add a few drops of Lugol's iodine into 1 ml of 1 % starch solution. Observe the color changing! Heat the mix up until the coloration disappears. After that cool the test tube under cold water. Repeat the study with sugar solution.
- 2, Cut a potato into 2 piece and add a drop of lugol's iodine onto the potato. Observe the color changing!
- 3, Cut the potato into small pieces and fill the test tube with water up to 1/3
- 4, Take some scrapings from the potato with a knife, Put it on a microscope slide and add a drop of water to the scrapings. Cover it with a microscope cover slip! Put some lugol's iodine right next to the cover slip and put a filter paper streak to the other side of the cover slip. After that put the microscope slide into the microscope and study it with 100x magnification. Observe the purplish blue starch granules!



Observation:

- 1, The starch solution turns blue, if we heat it then the color disappears and if we cool it then it turns blue again. The sugar solution doesn't change.
- 2, The freshly cut surface turns blue
- 3, The solution turns blue, if we heat it the color disappears
- 4, The starch granules are purplish blue, layered structured and their layers are eccentric



Explanation

The potato tuber is an underground modified stem. It contains mainly starch as a nutrient reserve. The starch in the vegetable cells gives a blue color to iodine. The starch granules have a layered structure. We see the layered structure because the water content of the layers is different and accordingly their light refraction too. The shape and the stratification of the starch granules are characteristic of the given plant. The particles are of two different materials. The amylose which forms the inner membrane is soluble in water, but the amylopectin which forms the outer membrane is not. The long chain of the amylose molecule has a helical structure.

