

Plant Pigments

Introduction:

Photosynthesis begins when light is absorbed by pigments in the plant cell. One technique for separating and identifying these pigments is paper chromatography. In paper chromatography, solvent moves up the paper carrying with it dissolved substances-in this case plant pigments. The pigments are carried along at different rates because they are not equally soluble in the solvent and are attracted in different degrees to the paper.

Many green leaves contain pigments that are not seen until autumn because they are hidden by the chlorophyll. A few plants have leaves that are red, orange, or yellow all year long.

In this lab, you will use paper chromatography to determine what differences exist in the plant pigments of various colors of leaves. You will also determine leaves or which parts of leaves contain the chlorophyll necessary to carry out photosynthesis.

Hypothesis: What plant pigments can be found in different colored leaves?

Materials:

Chromatography paper	test tube set up	coin
70% isopropyl alcohol	spinach leaf	other plant leaves
Scissors	stapler	metric ruler
Pencil		

Procedure:

1. Cut two pieces of chromatography paper a little bit longer than the test tube. Using a pencil, draw a base line 1.5 cm from the bottom of each strip.
2. Place a spinach leaf over the pencil line on one of the strips. Roll the coin over the leaf so that a horizontal green line is transferred to the pencil line. Repeat this step with the other leaf and the second strip of chromatography paper.
3. Add just enough isopropyl alcohol to each of the test tubes to cover the bottom. Do not add more than 1 cm to ensure that the pigment line will not be submerged when the paper is lowered into the test tube.

4. Lower each strip of paper into a test tube containing alcohol. The solvent will begin to move up the paper and cause the pigments to move as well.
5. Place the stopper on each test tube. Do not disturb the set up for approximately 15 minutes or until the solvent is about 1 cm from the top of the paper.
6. When the solvent is about 1 cm from the top of the strip, remove the strip and mark the farthest point of the solvents progress (front line) with your pencil before this line evaporates.
7. Allow the chromatography paper to dry, and then make a sketch of the chromatogram. Some possible colors and the pigments they represent are: faint yellow-carotenes; yellow-xanthophyll; bright green-chlorophyll a; yellow-green-chlorophyll b, red-anthocyanin.

Data:

	Line	Color Observed	Probable Pigment
SPINACH	1 (base line)		
	2		
	3		
	4		
	5 (front line)		
OTHER LEAF	1 (base line)		
	2		
	3		
	4		
	5 (front line)		

Analysis and Conclusions:

1. How many pigments were separated in each type of leaf?
2. How did the pigments in the spinach leaf compare with the pigments in the other leaf?
3. Which of these leaves can carry on photosynthesis? Explain your answer.