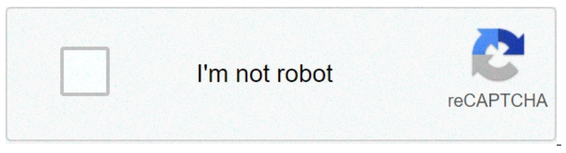

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Separation of plant pigments by paper chromatography lab report pdf

Paper chromatography is a useful technique in the separation and identification of different plant pigments. In this technique, the mixture containing the pigments to be separated is first applied as a spot or a line to the paper about 1.5 cm from the bottom edge of the paper. The paper is then placed in a container with the tip of the paper touching the solvent. Solvent is absorbed by the paper and moves up the paper by capillary action. As the solvent crosses the area containing plant pigment extract, the pigments dissolve in and move with the solvent. The solvent carries the dissolved pigments as it moves up the paper. The pigments are carried along at different rates because they are not equally soluble. Therefore, the less soluble pigments will move slower up the paper than the more soluble pigments. This is known as developing a chromatogram. Paper chromatography is useful for identifying unknown compounds - often used in crime scene investigations to match ink, lipstick, or colored fibers. There are many examples of chromotography at youtube.com. This set-up shows two different pen inks. Purpose: To identify plant pigments by separation and isolation of the pigments using thin layer paper chromatography. The distance traveled by a particular compound can be used to identify the compound. The ratio of the distance traveled by a compound to that of the solvent front is known as the Rf value; unknown compounds may be identified by comparing their Rf's to the Rf's of known standards. Rf equation: Rf = distance traveled by compound distance traveled by solvent 1. Cut a strip of coffee filter (or filter paper). Draw a horizontal line with a pencil (not pen) about half an inch from the bottom. Place a spinach leaf on the line and roll a penny over it so that you get a line of green pigment on the filter. Using a different part of the leaf, roll the penny again over the same line. Repeat this process until the line is fairly dark. 2. Put about an inch of acetone in the beaker (isopropyl alcohol will also work.) 3. Tape the top of the coffee filter strip to a pencil and balance the pencil across the top of the beaker. See the image below for the set-up. 4. It is very important that the bottom of the filter strip is in the acetone, but the green spot is not in the liquid. If the acetone touches the spot directly, the pigment will just dissolve away. 5. Observe what happens to the liquid in the beaker and the spot on the filter paper. Results will take about 20 minutes. 6.Optional: Repeated using other pigments - try lipstick, felt tip pens, skittles candy..etc Analysis 1. Assign a band number for each pigment band - you should see greens, yellows, oranges..etc. Band Color Plant Pigment Distance (mm) Rf (use formula) Yellow to Yellow-orange Carotene Yellow Xanthophyll Bright Green to Blue Green Chlorophyll a Yellow Green to Olive Green Chlorophyll b 2. Explain how a crime lab could use paper chromatography to determine if lipstick found at a crime scene matched the lipstick of a suspect. One of the requirements for the photosynthesis process to occur, the plant cells need sufficient light. Pigments are the substances that absorbed visible light. Different pigments absorb light of different wavelengths. From the absorption spectrum of chlorophyll a, it suggests that blue and red light work best for photosynthesis. There is a high degree correlation between the absorption spectra of leaf and the absorption spectra of chlorophyll a, chlorophyll b and carotene. It is because those pigments are used to absorb the visible light for the leaf. Turn in your highest-quality paper Get a qualified writer to help you with " Lab Report for Chromatography " Get high-quality paper NEW! AI matching with writer The phenomenon of capillarity is involved in this technique. The relative molecular mass of chlorophyll b is greater than chlorophyll a. Since it is lighter, chlorophyll b can cause more rise of the chromatography solvent in the microscopic spaces between the fibres of the chromatographic strip. So, this technique is very sensitive laboratory tool since it can differentiate existence pigments in a plant based on the molecular structure of the pigments. From the experiment results, the Carotenoid has the lightest molecular weight. Its ratio of front is less than chlorophyll b, meaning that it can cause more raise between the microscopic spaces between the fibres of chromatographic strip. There is correlation between molecular weight and the manner in which the pigments separate. As the molecular weight decrease, the respective coloured band for each pigment can rise higher. Two physical phenomena that make paper chromatography possible are the capillarity and the solubility The other uses for paper chromatography are separating amino acids and sugar. Limitations Since this is a qualitative experiment, there are a lot of precaution steps that must be taken during the experiment. Firstly, this experiment needs a chromatography paper strips. During the handling of the strips, it must be only touched on the edges and near one end only to avoid any errors occur during the phenomena of capillarity. Then, a capillary tube is used to spot the pigment on the paper strip. It must be ensured that only a small spot must be spotted on the strip. It must be neatly respotted until a dark green spot is produced to get more reliable result. Another step is during the placement of the strip in the tube. It must be ensured that the pigments extract spot is not immersed in the solvent. The main problem during the experiment is the lack of time to do the experiment carefully since it must be completed in 2 period times. So, more time should be provided to finish this experiment. For example, during the respotted period of the pigments spot, it must be ensure that each spot is dry before another spot is produced. Conclusion: Chromatography is a technique to differentiate several pigments in plant. The photosynthetic pigments in spinach are chlorophyll b and Carotenoid. However, theoretically, it should have 4 pigments, chlorophyll a, chlorophyll b, xanthophyll, and carotene. During the chromatography process, a solvent mixture that causes the individual pigments to be separated during the run is selected; the loaded chromatogram is lowered into the solvent and the solvent travels up the paper; the run is stopped when the solvent front nears the top of the paper. Turn in your highest-quality paper Get a qualified writer to help you with " Lab Report for Chromatography " Get high-quality paper Helping students since 2015 Separation of Photosynthetic Pigments by Paper Chromatography Introduction Chlorophyll is in fact only one pigment in a group of closely related pigments commonly found in photosynthesising plants called photosynthetic pigments. This can be demonstrated by extracting the pigments from leaves with acetone and separating them by means of paper chromatography. With a bit of luck five pigments can be identified: chlorophyll a (blue-green), chlorophyll b (yellow-green), xanthophylls (yellow), carotene (orange) and phaeophytin (grey, it is a breakdown product of chlorophyll). Absorptive paper with a concentrated spot of leaf extract is used in this experiment. When dipping in a suitable solvent, the pigments ascend the absorptive paper at different rates because they have different solubilities in the solvent. In this way they become separated from one another and can be identified by their different colours and positions. Requirements: l Large test tube (24 * 150 mm); l Stopper to fit test tube; l Pin; l A small glass tube to transfer pigment solution; l Chromatography paper or filter paper; l Rack of test tube; l Pigment solution; l Solvent (5 cm3). Procedure: l A strip of absorptive paper has been prepared. It has such a length that it almost reaches the bottom of a large test tube and such a width that the edges do not the sides of the tube; l Draw a pencil line across the strip of paper 30 mm from one end. The paper has been folded at the other end through 90 degrees and attached to the stopper using a pin. Take care not to let the lower end of the paper touch the bottom of the tube or edges touch the sides; l Remove the paper from the boiling tube and use the small glass tube provided, place a drop of the pigment solution at the centre of the pencil line. Dry the spot under the heat from a hairdryer or let it dry naturally. Place a second small drop on the first. You're Reading a Free Preview Page 3 is not shown in this preview. You're Reading a Free Preview Pages 6 to 12 are not shown in this preview.