

# Free essay on what is chromatography and how does it work

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Chromatography is a laboratory technique which involves the partitioning of molecules of plant pigments. In this technique a mixture is dissolved in a fluid which carries the unknown analyte to a structure which can hold the material causing the two components to separate. This technique can be categorized as preparative or analytical. By preparative chromatography it means, the separation of a mixture for the purpose of advance utility in this case, the mixture undergoes a purification process. Analytical chromatography on the other hand is prepared in smaller doses of materials and is performed casually to measure the relative proportions of analytes in the mixture. In this experiment the objective is to prove that the ink of the marker is composed of many types of pigments.

There are two phases in this separation technique the stationary phase and the mobile phase. In stationary phase a particular solid or gel-based packing or a highly viscous liquid coated inside of the column stays in place. In the mobile phase however, a solvent flows through the column carrying the analyte. For the coffee filter chromatography experiment the solvent is water. As water enters the column which in this case is the coffee filter it carries parts of the inks until it leaves the filter. It is noteworthy to mention that the lighter colors in the filter paper is a particular identity if a molecule that is part of the pigment. Thus the movement of the fluid through a column is known as elution.

Through a chromatogram one can measure the flow rate of solvent for which in case of this experiment is water (i. e. a flow rate is calculated as the ratio of the amount of mobile phase that passed per unit time). Within the chromatogram retention time is also measured which can be used to identify

the molecule. It is defined as the time between the injection and detection of the analyte. This retention time serves as the basis for the identity of the molecule since different components of the mixtures travel at different speeds also.

The principle is also similar in the case of bottle rainbow chromatography. Smaller water-loving molecules which are part of the food coloring travel faster through the paper. Like the ink marker in the coffee filter chromatography experiment, the food coloring also is composed of many types of pigments. Compounds which are not soluble in water along with molecules that are bigger and have a larger mass move slower along the paper. The colors which did not move from the original start point are made of heavier molecules while those that move further away are lighter ones. Thus creating a rainbow color. In a rainbow the principle is that pigments capture a particular wavelength of light which reflects different types of color. For instance, the green pigment in plants can be explained by the ability to absorb wavelengths between 470 and 650 nanometer.