

PAPER CHROMATOGRAPHY

I. Introduction

We will conduct an experiment called 'Paper Chromatography.' Paper Chromatography is a method used to separate a mixture into its individual components by exploiting the chemical properties of each part. This demonstration aims to observe how the colors from the candies behave. Will the colors rise or will they spread? To carry out our experiment, the materials needed are a beaker, candies, a pencil, clear tape, clear plastic wrap, filter paper, a watch glass, a ruler, a toothpick, ethyl alcohol, and water. We anticipate that our investigation will yield positive results.

II. Experiment Results

As we placed the chromatography paper into the beaker with ethyl alcohol, we observed the vibrancy of the colors as they ascended. The shades did not disperse; instead, they continued moving upward. Upon completing our experiment, we noticed all five colors rising, signifying the success of our investigation.

III. Data Analysis

In our paper chromatography experiment, we aimed to separate and analyze the pigments present in various candy coatings using materials such as beakers, watch glasses, candy samples, water, filter paper, a ruler, a pencil, a toothpick, ethyl alcohol, and clear plastic. We recorded the distances traveled by different candy coatings on the paper chromatography strips. The blue candy coating moved 4.0 cm, the yellow coating covered 5.5 cm, the red coating migrated 5.0 cm, the violet coating traveled 3.0 cm, and the pink coating exhibited the shortest distance of only 1.3 cm. These measurements provide insights into the characteristics of each candy coating color. The distance traveled by each pigment reflects its solubility and affinity for the chromatography paper and solvent. Based on our observations, the yellow pigment showed the highest solubility and strongest interaction with the solvent, while the pink pigment exhibited the lowest solubility. Further analysis and comparison with known pigment properties can help identify the specific compounds responsible for these colors.

IV. Discussion

The results obtained from the experiment confirmed our hypothesis that there are different colors or pigments present in the candy coatings. The separation of colors observed on the chromatography paper indicates that the candy coating is not a single color but is composed of multiple colors that can be separated using chromatography.

The gradual movement of the colors up the chromatography paper suggests that the pigments in the candy coatings have varying solubilities. It is likely that the pigments with higher solubilities migrated faster than those with lower solubilities. This could be due to differences in molecular size, polarity, or interaction with the chromatography paper and the solvent.

The fact that the colors were observed to be climbing up gradually without dispersing indicates that the pigments have some degree of affinity towards the chromatography paper and were predominantly absorbed onto the paper rather than spreading out. This could be attributed to the interactions between the pigments and the paper, such as adsorption or capillary action.

It is important to note that the specific chromatography patterns observed for each color can provide valuable information about the composition and quality of the pigments used in the candy coatings. Further analysis and comparison of these patterns could potentially help in identifying the specific pigments present in different candy coatings.

IV. Discussion

However, it is important to acknowledge the limitations of the experiment. The experiment was conducted on a small scale using only a limited number of candy samples. Therefore, the results obtained might not be fully representative of all types of candy coatings available in the market. Additionally, factors such as the concentration of the pigments and the solvent used could have influenced the separation results.

To further improve the experiment, it would be beneficial to increase the sample size and conduct the experiment with a wider range of candy coatings. Moreover, conducting multiple repetitions of the experiment and controlling for variables such as temperature and humidity could enhance the reliability and accuracy of the results.

To sum up, the chromatography experiment successfully separated the pigments present in candy coatings, revealing the presence of multiple colors. The results obtained provide valuable insights into the composition and characteristics of the pigments used in candy coatings. Further research and analysis could contribute to a deeper understanding of the pigments' properties and potential applications in both scientific research and industry.

V. Conclusion

The goal of this paper's chromatography experiment is to analyze and study the movement of the colors that we collected using the candy pigments that we separated through water. The experiment was carried out successfully because all of the colors moved, demonstrating that chromatography can be successfully used as a separation technique. The ability of chromatography to separate, identify, and analyze complex mixtures makes it a crucial component of scientific methodology. Numerous disciplines, including chemistry, biochemistry, pharmaceuticals, and environmental sciences, among others, heavily utilize chromatography. Researchers can improve analytical performance by customizing chromatographic processes for specific applications using the information gained from this experiment

VI. Applications and Real-life Connections

Chromatography is a technique used in laboratories to separate a mixture. It is used to test drug levels and the purity of water. It's also used to figure out how nutritious a food sample is. It is used to identify the chlorophyll type in various photosynthetic organisms. Paper chromatography is essential in the field of chemistry for separating and identifying components within mixtures.

One of the most important applications is in forensic science. Rodriguez & Gorskie (2022) describes paper chromatography as used in forensics to analyze components found in fingerprints and some bodily fluids. These compounds are separated by a liquid solvent as they pass through a filter paper. Forensic investigators use paper chromatography to analyze complex mixtures such as ink samples, illegal drugs, and biological fluids. Forensic experts can identify the chemical composition of Ink from forged documents, detect the presence of drugs in bodily fluids, and contribute to the resolution of criminal cases by separating the components of these substances on chromatography paper.

VI. Applications and Real-life Connections

Lastly, paper chromatography plays an essential role in our lives, influencing many aspects of modern society. This technique is critical in maintaining the quality of life we have today, from ensuring the safety of pharmaceuticals and food products to preserving our environment and assisting criminal investigations. Its versatility, low cost, and ease of use make it a valuable tool in science, industry, and education. Paper chromatography evolves and remains an indispensable asset in our pursuit of knowledge, health, and a sustainable future as technology advances.

VII. References

Rodriguez R.A., & Gorski S. (2022, August 4) Chromatography in Forensics: Definitions and Uses: A guide – Study. https://study.com/learn/lesson/chromatography-types-uses_forensics/

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