Lab Report 1213: Analysis of Oil Mixtures

Introduction

This report investigates various combinations of ingredients using different analytical techniques. The primary focus is on the physical and chemical properties of mixtures containing Almond Oil or Jojoba Oil combined with substances like Cetyl Alcohol, Beeswax, Gum, Glycerin, and Vitamin E. To comprehensively analyze the samples, we employed diverse instruments such as centrifuges, chromatographs, spectrometers, and more.

Materials and Methods

Purpose: To separate components based on density differences.

Gas Chromatograph GC-2010

Purpose: To identify chemical compositions through volatilization.

HPLC System HPLC-9000

Observation: Methodology Overview

Due to high variability in sample viscosity and temperature sensitivity, precise calibration was necessary. Equipment malfunctions were minimal but isolated incidents temporarily affected data collection.

Results and Discussion

1. Sample Composition and Viscosity

Analyses suggest significant variation in viscosities:

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| --- | --- | --- | --- |
| **Instrument** | **Oil Type** | **Additives** | **Viscosity (cP)** |
| Viscometer | Almond Oil | Beeswax, Glycerin | 7057.62 |
| Viscometer | Jojoba Oil | Gum, Glycerin | 2090.92 |

The viscosity differences highlight the impact of additive composition on rheological properties.

2. Temperature and Chromatographic Analysis

Temperature and chemical concentration revealed distinct thermal properties and molecular diversity:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Oil Type** | **Additives** | **Measurement** | **Unit** |
| Thermocycler TC-5000 | Almond Oil | Cetyl Alcohol, Glycerin | 45 | °C |
| X-Ray Diffractometer XRD-6000 | Almond Oil | Beeswax | 120 | °C |
| Liquid Chromatograph LC-400 | Almond Oil | Beeswax | 420 | µg/mL |
| Mass Spectrometer MS-20 | Jojoba Oil | Beeswax, Vitamin E | 800 | m/z |

A higher thermal threshold was noted with Almond Oil and Beeswax compared to its former combination with Cetyl Alcohol and Glycerin.

3. Conductivity and pH Variability

Measurements of electronic conductivity revealed variability, contingent on primary oil:

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Oil Type** | **Additives** | **Conductivity (uS/cm)** |
| Conductivity Meter | Jojoba Oil | Glycerin | 1500 |

This suggests that Jojoba Oil results in higher conductivity levels when mixed with Glycerin, potentially due to enhanced ion mobility.

Irrelevant Information

While analyzing the samples, a video loop showcasing cloud formations unexpectedly appeared on the laboratory screens. This disrupted colleague concentration momentarily but had no significant impact on data integrity. Additionally, lab equipment appeared to emit a slight hum, speculated to be from nearby electronic devices, although unrelated to sample processing.

Conclusions

The study yielded insightful data regarding how different oils and additives interact, affecting properties such as viscosity, thermal stability, and chemical composition. These results can inform formulation strategies in industries where oil mixtures are crucial, such as cosmetics or pharmaceuticals.

Further investigations are required to decipher the subtle interactions observed between the different chemical constituents, especially regarding their potential reactivity and stability over extended periods.