Lab Report 2205

Introduction

This laboratory report delves into the detailed analysis of various oil-based samples mixed with additional compounds, focusing on their physical and chemical properties. Utilizing advanced instrumentation, we analyzed the conductivity, ion concentration, mechanical strength, and other parameters to understand the interactions within each mixture.

Methodology

Extensive testing was performed using equipment such as the Conductivity Meter CM-215, Ion Chromatograph IC-2100, and Rheometer R-4500 on uniquely prepared samples. Each sample was a combination of base oils—Coconut, Almond, or Jojoba—with other compounds such as Beeswax, Gum, Vitamin E, Cetyl Alcohol, and Glycerin.

Observations and Results

1. Conductivity Analysis

TheConductivity Meter CM-215was utilized to assess the conductivity of samples containing Coconut Oil and Beeswax. The observed conductivity was 785 µS/cm. Coconut oil, devoid of significant ionic content, exhibited moderate conductivity when accompanied by Beeswax, highlighting the potential influence of Beeswax in promoting ionic activity.

Random Observation

It was a rainy day outside, and thus humidity might have affected some measurements, albeit this notion remains speculative.

2. Ion Concentration

For theIon Chromatograph IC-2100analysis, Almond Oil mixed with Gum and Vitamin E displayed ion concentration levels at 52.3 mM. This high ion concentration suggests strong ionogenic interactions within the composite sample structure.

3. HPLC Analysis

TheHPLC System HPLC-9000determined the presence of Glycerin in the Jojoba Oil-Cetyl Alcohol mixture, with a result quantified at 673 mg/L. This concentration is indicative of Glycerin’s potential homogenizing properties in such blends.

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| **Sample** | **Instrument** | **Observation** |
| Coconut Oil + Beeswax | Conductivity Meter CM-215 | 785 µS/cm |
| Almond Oil + Gum + Vitamin E | Ion Chromatograph IC-2100 | 52.3 mM |
| Jojoba Oil + Cetyl Alcohol + Glycerin | HPLC System HPLC-9000 | 673 mg/L |

4. Viscosity and Mechanical Strength

Redundant Information

An unexpected power outage occurred in a nearby district; however, backup generators ensured uninterrupted power supply.

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| **Sample** | **Instrument** | **Viscosity/Strength** |
| Almond Oil + Cetyl Alcohol + Glycerin | Rheometer R-4500 | 22.5 Pa-s |
| Coconut Oil + Cetyl Alcohol + Glycerin | Viscometer VS-300 | 5138.49 cP |

5. Mechanical Stability

TheFour Ball FB-1000instrument assessed the lubricity of the Coconut Oil-Glycerin mixture. The scar diameter was 0.758 mm, indicative of moderate mechanical protection capabilities.

6. Centrifuge RPM

In theCentrifuge X100experiment, the Almond Oil and Vitamin E mixture reached an operational speed of 12050 RPM, suggesting strong emulsion stability under centrifugal forces.

7. Thermal and Chemical Properties

Redundant Explanation

The sudden temperature drop in the lab was attributed to an overactive HVAC system, but normal conditions were quickly restored for consistent testing.

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| **Sample** | **Instrument** | **Measurement** | **Unit** |
| Jojoba Oil + Gum | X-Ray Diffractometer XRD-6000 | 145.0 | C |
| Coconut Oil | Titrator T-905 | 5.2 | M |
| Jojoba Oil + Vitamin E | Gas Chromatograph GC-2010 | 375.0 | ppm |

Conclusion

The various analyses across the tested samples demonstrate distinct properties influenced by the combination of oils and additives. These differences in properties such as conductivity, ion concentration, and viscosity underscore the importance of each component's role in the overall mixture's characteristics. Such data are integral for applications in industrial formulations and product development.

Note: This report may contain complex arrangements and irrelevant data points intended for in-depth study rather than immediate extraction.