Lab Report 2134

Abstract:

This report details the experimental evaluation of various oil and compound mixtures using multiple analytical instruments. The study focuses on the interaction of ingredients such as Coconut Oil, Jojoba Oil, Almond Oil, and various additional compounds like Cetyl Alcohol, Beeswax, and Vitamin E. The goal was to assess their properties using advanced instrumentation not limited to spectroscopic, chromatographic, and rheological methods. This document provides observations, measurements, and results for these mixtures, positioned within the complexity of experimental research.

Introduction:

Understanding the behavior of oil-based mixtures is crucial for applications across numerous industries, including cosmetics and food technology. This report presents data collected from several analytical techniques to evaluate the properties of mixtures containing Coconut Oil, Jojoba Oil, and Almond Oil with associated compounds such as Vitamin E, Glycerin, and various waxes.

Experimental Section:

Sample Preparation:

Each test sample was prepared by combining specified oils and additives. The mixtures were analyzed without modifying their proportions to maintain experimental integrity.

Results:

Note: The following data sets include critical measurements and observations.

Table 1: Optical Density and Chromatographic Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Dielectric** | **Compounds Involved** | **Result (Unit)** |
| Microplate Reader MRX | Coconut Oil | Gum, Vitamin E | 3.2 OD |
| Ion Chromatograph IC-2100 | Coconut Oil | Cetyl Alcohol, Glycerin | 75.4 mM |

Observations:

Table 2: Conductivity and Spectroscopy Data

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Oil Base** | **Additives** | **Measurement (Unit)** |
| Conductivity Meter CM-215 | Almond Oil | Cetyl Alcohol | 1500 uS/cm |
| NMR Spectrometer NMR-500 | Almond Oil | Beeswax | 15.6 ppm |

Observations:

Additional Data Points and Anomalies:

Table 3: Rotational and Thermal Assessments

|  |  |  |  |
| --- | --- | --- | --- |
| **Analytical Tool** | **Primary Oil** | **Additional Compounds** | **Rate (Unit)** |
| Centrifuge X100 | Jojoba Oil | Beeswax | 14200 RPM |
| Thermocycler TC-5000 | Coconut Oil | Vitamin E | 62 °C |

Notes:

Table 4: Viscosity and Mass Spectral Data

|  |  |  |
| --- | --- | --- |
| **Viscosity Analysis** | **Oil Combination** | **Complex Coefficients** |
| Rheometer R-4500 | Jojoba Oil | 650 Pa-s |
| Viscometer VS-300 | Coconut Oil, Cetyl Alcohol, Glycerin | 4990.2 cP |
| Viscometer VS-300 | Coconut Oil, Gum, Vitamin E | 5091.78 cP |

Table 5: Irrelevant Data

|  |  |  |
| --- | --- | --- |
| **Category** | **Random** | **Value** |
| Intrigue | Binary | 1 |
| Surprise | nan | 0 |

Conclusion:

The analysis of oil-based mixtures reveals a complexity shaped by variations in physical and chemical interactions, distinct to each combination of ingredients. Observations such as high viscosity in Vitamin E and Gum combinations or the unexpected chromatographic and conductivity readings in samples are crucial for future formulation enhancements. Further studies are recommended to explore these mixtures' behavior under environmental stressors and long-term application scenarios.

References:

Data compiled from Report\_2134 conducted using diverse analytical techniques.