Lab Report: Report\_1806

Introduction

The current investigation aimed to evaluate the properties of various oil mixtures, incorporating different compositions to examine their chemical and physical characteristics. Various sophisticated instruments were employed for accurate measurements. The selection criteria for the samples included a combination of oils with potential industrial applications in cosmetics and food industries.

Equipment and Methodology

Instruments utilized in this study included:

The samples tested included combinations of Jojoba Oil, Almond Oil, and Coconut Oil with additional substances such as Beeswax, Vitamin E, Gum, Glycerin, and Cetyl Alcohol.

Results

Below are the observations and measurements recorded during the experiment. The data table highlights the intricate findings obtained through detailed analysis.

Table 1: Sample Analysis and Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment Used** | **Sample Composition** | **Measurement** | **Unit** |
| Titrator T-905 | Jojoba Oil | 5.4 | M |
| Conductivity Meter CM-215 | Coconut Oil + Beeswax | 1234.0 | uS/cm |
| NMR Spectrometer NMR-500 | Jojoba Oil + Vitamin E | 15.2 | ppm |
| pH Meter PH-700 | Almond Oil + Gum + Glycerin | 6.8 | pH |
| PCR Machine PCR-96 | Almond Oil + Beeswax | 27.0 | Ct |
| Mass Spectrometer MS-20 | Jojoba Oil + Beeswax + Vitamin E | 150.6 | m/z |
| Gas Chromatograph GC-2010 | Coconut Oil + Beeswax | 230.7 | ppm |
| X-Ray Diffractometer XRD-6000 | Jojoba Oil | 120.0 | C |
| Viscometer VS-300 (Sample A) | Jojoba Oil + Cetyl Alcohol | 2716.22 | cP |
| Viscometer VS-300 (Sample B) | Coconut Oil + Cetyl Alcohol + Vitamin E | 4834.22 | cP |

Note: Certain samples exhibited unexpected behavior, including fluctuations in viscosity and atypical electrical conductance, suggesting potential interactions between components.

Discussion

The viscosity readings from the Viscometer VS-300 highlighted distinct differences in consistency between samples. Notably, the mixture of Coconut Oil, Cetyl Alcohol, and Vitamin E showed a significantly higher viscosity of 4834.22 cP compared to 2716.22 cP for the Jojoba Oil and Cetyl Alcohol mixture. This suggests a potential alteration in structural characteristics, likely due to the addition of Vitamin E.

Conductivity and acidity levels further illustrated the complex nature of the samples. Electrical conductivity of Coconut Oil and Beeswax (1234 uS/cm) provided insight into the ionic interactions within the mixture, contrasting with the acidic balance of Almond Oil blended with Gum and Glycerin (pH 6.8).

Precise NMR and MS analyses identified compounds and structural configurations, revealing that Jojoba Oil and Vitamin E contained 15.2 ppm concentration of targeted molecules, alongside a mass-to-charge ratio of 150.6 m/z in the presence of additional components.

X-Ray diffraction of pure Jojoba Oil indicated a thermal property value of 120 C, an unexpected detail possibly attributed to internal configurations.

In summary, the data signifies how variations in component combinations critically influence sample properties.

Observations

Conclusion

The conducted analyses provided comprehensive insights into the chemical and physical behavior of oil-based mixtures. Each instrument unveiled a different aspect of the composition, supporting the hypothesis that additives significantly alter the primary characteristics of base oils.

Further research is essential for explicating these interactions and for exploring potential applications in industrial manufacturing processes, thus enhancing product formulations.

End of Lab Report