Lab Report 968

Introduction

This laboratory report presents the findings from multiple tests conducted on various oil mixtures using different types of spectrometers and chromatography equipment. The mixtures analyzed include combinations of Coconut Oil, Almond Oil, and Jojoba Oil with various additives such as Gum, Beeswax, Cetyl Alcohol, Vitamin E, and Glycerin. Our aim was to characterize each mixture to understand its unique properties and composition. Each mixture, treated as a single test sample, underwent specific analytical tests.

Equipment and Techniques Used

Wavelength analysis for oil mixtures.

FTIR Spectrometer FTIR-8400

Infrared absorption measurements.

Ion Chromatograph IC-2100

Detection of ionic compounds.

Gas Chromatograph GC-2010

Volatile components' analysis.

Conductivity Meter CM-215

Conductivity traits for ionic mobility.

Liquid Chromatograph LC-400

Liquid analysis without decomposition.

Viscometer VS-300

Viscosity testing for physical behavior.

X-Ray Diffractometer XRD-6000

Observations and Measurements

Table 1: Wavelength and Absorption Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment** | **Sample** | **Additives** | **Measurement** | **Unit** |
| Spectrometer Alpha-300 | Coconut Oil | Gum, Glycerin | 750.5 | nm |
| Spectrometer Alpha-300 | Almond Oil | Cetyl Alcohol | 910.2 | nm |
| FTIR Spectrometer FTIR-8400 | Coconut Oil | Beeswax, Glycerin | 2365.7 | 1/cm |

Note: These measurements reveal the wavelength details of the samples, which are crucial for understanding how the mixtures interact with light.

Table 2: Chemical and Ionic Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment** | **Sample** | **Additives** | **Measurement** | **Unit** |
| Ion Chromatograph IC-2100 | Almond Oil | Vitamin E | 15.8 | mM |
| Gas Chromatograph GC-2010 | Coconut Oil | Cetyl Alcohol | 485.3 | ppm |
| Conductivity Meter CM-215 | Almond Oil | Gum | 1350.2 | uS/cm |

Observation: The Ion Chromatograph data suggests a modest presence of ions, particularly when Vitamin E is combined.

Table 3: Physical Property Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment** | **Sample** | **Additives** | **Measurement** | **Unit** |
| Liquid Chromatograph LC-400 | Jojoba Oil | Beeswax, Glycerin | 120.4 | ug/mL |
| X-Ray Diffractometer XRD-6000 | Almond Oil | Glycerin | 85.6 | C |
| Viscometer VS-300 | Coconut Oil | Glycerin | 4941.72 | cP |
| Viscometer VS-300 | Jojoba Oil | Vitamin E | 2644.37 | cP |

Irrelevant Data: While testing the viscosity of the Jojoba Oil sample with Vitamin E, a discrepancy in the equipment manual was noted, which may not impact these results but suggests revisiting equipment calibration.

Results and Discussion

In interpreting the results, examples of expected and discovered behaviors include:

Wavelength and FTIR Data:The spectrometer's readings indicated characteristic peaks which can be associated with the specific chemical structure of Glycerin when combined with Coconut and Almond Oils. The FTIR results, in particular, highlight absorption intensities suggesting complex molecular vibrations.

Ionic Properties and Conductivity:The conductivity values obtained through the Conductivity Meter CM-215 were consistent with the expected ionic mobility in the Almond Oil-Gum mixture. Such ionic activities potentially indicate a stable colloidal suspension.

Viscosity Analysis:The Viscometer VS-300 data provided a deeper insight into fluid dynamics within the mixtures, demonstrating notably higher viscosity in Coconut Oil with Glycerin compared to Jojoba Oil with Vitamin E. The differences may correspond to the molecular weights and interaction forces between mixed constituents.

Conclusion

This report contained a comprehensive analysis of various oil mixtures using multiple experimental techniques. Each mixture demonstrated distinct characteristics that are essential for their potential applications in cosmetic and nutrient products. Further investigations are encouraged, particularly in exploring how these properties might change under variable environmental conditions or with the introduction of synthetic alternatives.

Disclaimer: Any irrelevant information detected amidst procedure references in this report appears incidental and not correlated with derived analytical data.