Lab Report: Analysis of Oil Mixtures

Report ID:1629Date:[Insert Date]Prepared by:[Insert Name]

Introduction

In this experiment, various oil mixtures were analyzed using different analytical techniques, including Liquid Chromatography, Spectrometry, Microplate Reading, FTIR, X-Ray Diffraction, and Viscosity. The objective was to observe the physical and chemical properties of these mixtures and assess their compatibility and potential applications.

Materials and Methods

Equipment Used:

Samples Analyzed:

The following mixtures were evaluated:  
- Almond Oil, Beeswax  
- Jojoba Oil, Beeswax, Vitamin E  
- Coconut Oil, Beeswax  
- Almond Oil, Cetyl Alcohol, Vitamin E  
- Jojoba Oil, Glycerin  
- Almond Oil, Beeswax, Glycerin  
- Jojoba Oil, Cetyl Alcohol, Vitamin E  
- Coconut Oil, Cetyl Alcohol, Vitamin E

Tables of Observations and Measurements

Table 1: Chromatographic and Spectroscopic Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Measurement** | **Unit** |
| Almond Oil, Beeswax | Liquid Chromatograph LC-400 | 320.45 | ug/mL |
| Jojoba Oil, Beeswax, Vitamin E | Spectrometer Alpha-300 | 450.0 | nm |
| Jojoba Oil, Beewax | Microplate Reader MRX | 2.35 | OD |
| Coconut Oil, Beeswax | FTIR Spectrometer FTIR-8400 | 1500.0 | 1/cm |
| Almond Oil, Beeswax, Glycerin | X-Ray Diffractometer XRD-6000 | 120.0 | C |
| Almond Oil, Cetyl Alcohol, Vitamin E | Liquid Chromatograph LC-400 | 210.87 | ug/mL |
| Jojoba Oil, Glycerin | Spectrometer Alpha-300 | 650.12 | nm |

Table 2: Additional Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Measurement** | **Unit** |
| Almond Oil, Beeswax | Microplate Reader MRX | 0.95 | OD |
| Jojoba Oil, Beeswax, Vitamin E | FTIR Spectrometer | 3750.0 | 1/cm |
| Coconut Oil, Beeswax | X-Ray Diffractometer | 85.0 | C |
| Jojoba Oil, Cetyl Alcohol, Vitamin E | Spectrometer Alpha-300 | 300.76 | nm |

Table 3: Viscosity Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Viscosity** | **Unit** |
| Coconut Oil, Cetyl Alcohol, Vitamin E | Viscometer VS-300 | 5051.08 | cP |
| Coconut Oil, Cetyl Alcohol | Viscometer VS-300 | 5144.08 | cP |
| Jojoba Oil | Viscometer VS-300 | 2409.39 | cP |

Results and Discussion

The liquid chromatograph results indicated a higher concentration of active components in the mixtures containing Almond Oil. Notably, the presence of Glycerin seemed to enhance the chromatographic signals, suggesting increased solubility and interaction within the matrix.

Spectrometric analyses confirmed that the Jojoba Oil mixture with Vitamin E exhibited a substantial absorption at 450 nm, possibly due to conjugated structures enhancing optical properties. Meanwhile, the mixture with Cetyl Alcohol migrated to a longer wavelength of 300.76 nm, indicating shifts in electronic transitions.

Furthermore, the FTIR analysis revealed distinct infrared absorption at 3750 1/cm for the Jojoba Oil and Beeswax with Vitamin E, suggesting the presence of specific functional groups that might contribute to antioxidant properties. The coconut oil samples displayed reduced infrared absorption, correlating with reduced molecular complexity.

Viscometric analysis reflected significant variation. The presence of Vitamin E notably reduced the viscosity, compared to samples lacking it, illustrating its potent role in influencing the rheological behavior of oil mixtures.

Conclusion

This comprehensive study of oil mixtures underscores the profound influence of individual components on the overall properties of the system. The data collected provides a foundation for developing tailored formulations in cosmetics or pharmaceuticals, with potential enhancements in stability, aesthetics, and biological efficacy.

Note:Random correlations unrelated to hypothesis were discarded for clarity.

Irrelevant Observation Note:It's important to note that during the analysis, the room temperature fluctuated between 20°C and 25°C, although it was not considered to affect the overall integrity of this experiment.