Lab Report No. 906

Introduction

This report encompasses a series of analytical evaluations conducted using diverse instrumentation on distinct oil-based mixtures. The components being analyzed include combinations of Almond Oil, Jojoba Oil, and Coconut Oil with various constituents such as Gum, Cetyl Alcohol, Beeswax, Glycerin, and Vitamin E. The aim is to elucidate the physicochemical properties of each mixture utilizing several analytical techniques.

Instruments and Methodologies

Titration Analysis

Equipment: Titrator T-905Sample: Almond Oil with GumObservation: A sharp endpoint was noted, indicating the presence of a reactive component, likely within the acid-base spectrum.Result:Molarity: 3.456 M

X-Ray Diffraction

Equipment: X-Ray Diffractometer XRD-6000Sample: Almond Oil, Gum, Vitamin EObservation: Crystalline structures were predominantly absent; however, some degree of ordering was observable, possibly due to the Vitamin E content.Result:Characteristic Diffraction Peak: 45 units

Temperature:45 °C – The ambient condition for consistency across trials.

Liquid Chromatography Analysis

The analysis performed using a Liquid Chromatograph LC-400 presented unique separation profiles indicative of diverse compound masses and polarities.

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| **Sample Components** | **Specific Ingredient** | **Concentration** |
| Jojoba Oil, Cetyl Alcohol | - | 214.87 ug/mL |

Gas Chromatography Output

Equipment: Gas Chromatograph GC-2010Sample: Coconut Oil, Gum, GlycerinObservation: A bifurcated compound retention was noted, possibly due to the volatiles in coconut oil or the glycerin's hydrophilic nature.Result:Concentration of Glycerin: 720.4 ppm

Interesting Fact:The coconut variation exhibited a unique retention time anomaly, which could be indicative of additional volatile constituents. However, further investigation is required.

Rheological Properties

Rheometer Analysis

Instrument: Rheometer R-4500Sample: Almond Oil, Cetyl AlcoholObservation: Pseudoplastic behavior was observable, indicating non-Newtonian viscosity dynamics under stress.Viscosity Measurement:150.3 Pa-s

Nuclear Magnetic Resonance Spectroscopy

Another test using the NMR Spectrometer NMR-500 involved the mixture of Jojoba Oil, Gum, and Vitamin E.

Temperature fluctuation during storage was kept to a minimum (check external data logs for therm regulation details).

Optical Density and Thermal Cycler Measurement

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| **Equipment** | **Mixture** | **Measurement** |
| Microplate Reader MRX | Jojoba Oil, Beeswax, Glycerin | 2.3 OD |
| Thermocycler TC-5000 | Coconut Oil, Cetyl Alcohol, Vitamin E | 72 °C |

The optical density tests alluded to potential heterogeneity, possibly necessitating additional stabilizers. The heating experiment verified the thermal stability of the Vitamin E mix.

Viscosity Assessment

This segment explores the detailed viscosity of Jojoba Oil combined components:

Viscometer VS-300 Outcomes:

Jojoba Oil, Vitamin E:2766.7 cP

Jojoba Oil, Beeswax, Glycerin:2789.39 cP

Conclusion

Each experiment underscores the intricacies of physicochemical interactions within organic oil mixtures. The observed measurements reflect the compounds' inherent properties and compatibility potential.

Note:This document contains disparate data which highlights the complexity of these analyses, hence careful consideration is encouraged in data interpretation, given the deliberate scattering of information.

entin of Vitamin E being one of the tested components remains under the stable point analyzed.