Detailed Lab Report

Experiment Report: 1322

Introduction

This report documents the testing and analysis of various oil-based mixtures using different analytical instruments. The objective is to characterize each mixture's chemical, physical, and spectral properties through Gas Chromatography, FTIR Spectrometry, Titration, Mass Spectrometry, X-Ray Diffraction, Thermocycling, Conductivity, and Viscosity measurements. Each combination of ingredients serves as a unique test sample with its own set of evaluations and observations.

Instrumentation and Methodology

Table 1: Instruments and Mixtures

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Mixture Used** | **Irrelevant Data** | **Measurement** |
| Gas Chromatograph GC-2010 | Almond Oil | Random Entry 12 | 12.5 ppm |
| FTIR Spectrometer FTIR-8400 | Coconut Oil, Cetyl Alcohol, Vitamin E | Irrelevant Note | 950 1/cm |
| Titrator T-905 | Coconut Oil, Vitamin E | Unnecessary Info | 0.005 M |
| Mass Spectrometer MS-20 | Jojoba Oil, Vitamin E | Discardable Text | 550 m/z |
| X-Ray Diffractometer XRD-6000 | Jojoba Oil, Beeswax, Glycerin | Random Sentence | 75 °C |
| Thermocycler TC-5000 | Almond Oil, Beeswax, Glycerin | Useless Line | 60 °C |
| Conductivity Meter CM-215 | Coconut Oil, Gum, Glycerin | Unrelated Comment | 1500 uS/cm |
| Viscometer VS-300 | Coconut Oil, Glycerin | Extra Detail | 5082.79 cP |
| Viscometer VS-300 | Almond Oil | Surplus Text | 7428.5 cP |

Observations and Measurements

Section A: Spectroscopic Analysis

Gas Chromatograph GC-2010of Almond Oil indicated a concentration of12.5 ppm. No anomalies noted.

FTIR Spectrometer FTIR-8400results for the mixture of Coconut Oil, Cetyl Alcohol, and Vitamin E showed characteristic peaks at950 1/cm, indicating the presence of key functional groups.

Section B: Analytical Chemistry

Section C: Mass and Energy Analysis

Mass Spectrometer MS-20yielded a mass/charge ratio of550 m/zfor Jojoba Oil with Vitamin E. The precise fragmentation points towards intact molecular structures.

X-Ray Diffractometer XRD-6000data capturedJojoba Oil, Beeswax, and Glycerinheated to75 °C, promoting crystallinity and phase transitions, though further exploration of these phenomena is reserved for future study.

Section D: Thermal Dynamics and Conductivity

Thermocycler TC-5000with the mix of Almond Oil, Beeswax, and Glycerin exhibited a maintained temperature at60 °C, confirming the material's stability under thermal stress.

Conductivity Meter CM-215findings forCoconut Oil, Gum, and Glycerinresulted in a conductivity measure of1500 uS/cm, a complexity suggesting ionic presence and solvent accessibility.

Section E: Viscosity Testing

Viscometer VS-300noted thatCoconut Oil with Glycerinhad a viscosity of5082.79 cP, which points to its thick, cohesive nature. Remnants of this characteristic are hypothesized to impact potential applications in various industries.

Almond Oilalone was charted at a viscosity of7428.5 cP, a noticeable viscosity increase without additional components hindering flow dynamics.

Discussion

The diverse computational techniques applied across different spectrums and instruments provided pivotal insights into the complex interactions and characteristics of the oil mixtures. Each instrument's results, while separated by their intended analytical scope, collectively contribute to a comprehensive understanding of physical and chemical properties intrinsic to these samples.

Conclusion & Future Work

The outcomes underline a need for extended chemical analysis and advanced spectroscopic evaluations to asses comprehensive molecular interactions and reinforce present deductions. Further iterative experiments are planned to expound upon the discovered phenomena and incorporate additional variables.

Table 2: Additional Notes & Anomalies (Hidden Insights)

|  |  |  |  |
| --- | --- | --- | --- |
| **Random Id** | **Note** | **Instrument** | **Observation** |
| 1 | Minor deviations observed in repeated GC-2010 readings. | Gas Chromatograph | Variation within acceptable limits. |
| 2 | FTIR baseline drift noticed. | FTIR Spectrometer | Calibrated to minimalize spectral distortion. |
| 3 | No significant outliers | Titrator | Standard reagents confirmed stability. |
| 4 | Ambient temperature fluctuation during XRD analysis. | X-Ray Diffractometer | Offset corrections applied to maintain accuracy. |

All data were carefully reviewed, ensuring accurate representation of results across all stages of assessment, consolidating instrument outputs and synthesis within the established experimental framework.