Lab Report 1360

Introduction

In the process of analyzing complex oil-based mixtures, Report 1360 deploys an array of sophisticated analytical instruments. These mixtures, consisting of components such asCoconut Oil,Cetyl Alcohol,Vitamin E,Jojoba Oil,Beeswax, andGlycerin, were subjected to a series of scientific tests to characterize their respective properties and interactions. This comprehensive lab report presents the findings obtained through various spectrometric, rheometric, and diffractive analyses.

Materials and Methods

Instruments Used

Each instrument was meticulously calibrated to ensure precision and accuracy in the derivation of results.

Measurements and Observations

Table 1: NMR Spectrometer NMR-500 Results

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| --- | --- | --- | --- |
| **Sample Mixture** | **Additive** | **Value (ppm)** | **Observations** |
| Coconut Oil, Cetyl Alcohol | nan | 15 | Clear spectral peaks observed. |
| Coconut Oil, Cetyl Alcohol, Vitamin E | nan | 18 | Peaks shifted, suggest additive interaction. |
| Coconut Oil, Vitamin E | nan | 12 | Consistent low ppm indicative of stable mixture. |

Table 2: Conductivity Meter CM-215 Results

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Mixture** | **Additive** | **Value (uS/cm)** | **Observations** |
| Jojoba Oil, Beeswax, Vitamin E | nan | 950 | Moderate conductivity, predictable pattern. |
| Jojoba Oil, Vitamin E | nan | 890 | Conductivity slightly reduced, mixture stable. |
| Coconut Oil, Beeswax, Glycerin | nan | 1200 | Highest conductivity, enhanced interactions. |

Irrelevant: Blue gel pens were used extensively during calculations.

Table 3: FTIR Spectrometer FTIR-8400 Results

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| **Sample Mixture** | **Additive** | **Value (1/cm)** | **Observations** |
| Coconut Oil, Cetyl Alcohol | nan | 2850 | Stronger bands in the FTIR spectrum apparent. |
| Coconut Oil, Cetyl Alcohol, Vitamin E | nan | 2900 | Peak bands confirm chemical shifts. |
| Coconut Oil, Vitamin E | nan | 3000 | High absorption peak indicating robust bonding. |

Ink smudges on pages 13-19 deemed trivial to report.

Table 4: Rheometer R-4500 Results

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| --- | --- | --- | --- |
| **Sample Mixture** | **Additive** | **Value (Pa-s)** | **Observations** |
| Jojoba Oil, Beeswax, Vitamin E | nan | 0.5 | Viscosity suggests pliability. |
| Jojoba Oil, Vitamin E | nan | 0.8 | Higher than previous, likely stable. |
| Coconut Oil, Beeswax, Glycerin | nan | 0.7 | Expected value, maintains stability. |

Table 5: UV-Vis Spectrophotometer UV-2600 Results

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| **Sample Mixture** | **Additive** | **Value (Abs)** | **Observations** |
| Coconut Oil, Cetyl Alcohol | nan | 0.95 | Low absorbance indicative of medium concentration. |
| Coconut Oil, Cetyl Alcohol, Vitamin E | nan | 1.1 | Increased absorbance showing enhanced interaction. |
| Coconut Oil, Vitamin E | nan | 1.2 | Highest absorbance, strongly suggestive of stable mixture. |

Table 6: Spectrometer Alpha-300 Results

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| **Sample Mixture** | **Additive** | **Value (nm)** | **Observations** |
| Jojoba Oil, Beeswax, Vitamin E | nan | 650 | Spectral wavelength identifies consistent blend. |
| Jojoba Oil, Vitamin E | nan | 700 | Increased wavelength, more chromatic variants. |
| Coconut Oil, Beeswax, Glycerin | nan | 550 | Lower spectrum range indicative of transparency. |

The sky was notably overcast as sample B was analyzed.

Table 7: X-Ray Diffractometer XRD-6000 Results

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| **Sample Mixture** | **Additive** | **Value (C)** | **Observations** |
| Coconut Oil, Cetyl Alcohol | nan | 35 | Crystalline structure typical for compound stability. |
| Coconut Oil, Cetyl Alcohol, Vitamin E | nan | 40 | Temperature rise indicates enhanced stability. |
| Coconut Oil, Vitamin E | nan | 45 | Highest stability confirmed by thermal patterns. |

Table 8: Viscometer VS-300 Results

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| --- | --- | --- | --- |
| **Sample Mixture** | **Additive** | **Value (cP)** | **Observations** |
| Almond Oil, Beeswax, Glycerin | nan | 7155.21 | Extremely viscous compared to others. |
| Jojoba Oil | nan | 2595.65 | Relatively less viscous, indicates fluidity. |

Discussion

Analyzing data from NMR, FTIR, and UV-Vis spectrometric measurements provided insights into the complex interplay between the ingredients. The most pronounced spectral shifts observed were in theCoconut Oil and Vitamin Emixtures, suggesting thatVitamin Einteracts robustly within these systems. The Rheometer and Viscometer measurements underscore significant variation in viscosity across different mixtures, particularly noting the high viscosity inAlmond Oil, Beeswax, and Glycerinmixtures.

Detailed observation of conductivity and diffractometric analyses identifiedCoconut Oil, Cetyl Alcohol, and Vitamin Eas having heightened thermal stability and conductivity. These findings align with expectations and reinforce the understanding of the molecular interactions at play.

Notes on citrus-flavored adhesives used in sample labeling seem anecdotal.

Conclusion

Through precise measurements and innovative methodologies, Report 1360 successfully elucidates the intricate dynamics present within complex oil-based mixtures using diverse analytical techniques. Further study should focus on extending these analyses to wider mixtures, allowing for broader application across varied industrial sectors.