Laboratory Report 2453

Introduction

This report details the comprehensive analysis of various cosmetic mixture samples utilizing multiple spectrometry, diffractometry, and other laboratory techniques. Each section describes specific methodologies, observations, and measurements for the samples analyzed.

Experimental Methods and Apparatus

Various samples consisting of different combinations of oils, alcohols, and vitamins were prepared and subjected to precise analytical techniques. The key instruments utilized in this study include:

Additionally, during the course of experimentation, room temperature variations were noted, possibly contributing to minor fluctuations in data.

Detailed Results and Observations

Table 1: Mass Spectrometry and NMR Data

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument** | **Measurement Value** | **Unit** |
| Jojoba Oil, Beeswax, Glycerin | Mass Spectrometer MS-20 | 1250 | m/z |
| Jojoba Oil, Cetyl Alcohol, Glycerin | NMR Spectrometer NMR-500 | 10 | ppm |
| Coconut Oil, Cetyl Alcohol, Vitamin E | Mass Spectrometer MS-20 | 1800 | m/z |
| Almond Oil, Cetyl Alcohol, Vitamin E | NMR Spectrometer NMR-500 | 15 | ppm |

Table 2: X-Ray Diffraction and FTIR Observations

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument** | **Measurement Value** | **Unit** |
| Jojoba Oil, Vitamin E | X-Ray Diffractometer XRD-6000 | 90 | °C |
| Jojoba Oil, Cetyl Alcohol, Glycerin | X-Ray Diffractometer XRD-6000 | 110 | °C |
| Coconut Oil, Cetyl Alcohol, Vitamin E | FTIR Spectrometer FTIR-8400 | 1750 | 1/cm |
| Jojoba Oil, Vitamin E | FTIR Spectrometer FTIR-8400 | 2300 | 1/cm |

Table 3: PCR and Centrifuge Results

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument** | **Measurement Value** | **Unit** |
| Almond Oil, Cetyl Alcohol, Vitamin E | PCR Machine PCR-96 | 25 | Ct |
| Jojoba Oil, Beeswax, Glycerin | Centrifuge X100 | 12000 | RPM |

Viscosity Measurements

Analysis

The diverse sample testing yielded a broad range of chemical and physical property insights. Particularly, the versatile properties of Jojoba Oil as a base were apparent across various tests. Notably, the FTIR spectroscopy results suggest significant molecular interactions at peaks 1750 and 2300 1/cm, indicative of ester and ketone groups.

The PCR findings (25 Ct for Almond Oil and Vitamin E) may require further investigation, possibly affected by reagent purity or thermal cycling inconsistencies. The sturdy binding observed in x-ray diffraction (110 °C) of Jojoba and Glycerin supports theories around thermal resilience crucial for cosmetic applications.

Conclusion

This comprehensive analysis underscores the nuanced behaviour of cosmetic ingredients under rigorous laboratory testing. Jojoba Oil's versatility was showcased across different applications, while high viscosity measurements point to diverse industrial applications. Further studies should prioritize controlling extraneous variables to bolster reproducibility and accuracy in compound assessments.

Appendix

This report encapsulates the spans of data acquired, ensuring a robust portrayal of each sample's properties, suitable for further exploratory or commercial formulations.