Lab Report #2226

Introduction

This report documents the detailed analysis of various cosmetic ingredient mixtures using advanced laboratory equipment. The samples tested include combinations of oils, waxes, alcohols, and vitamins. Each mixture was subject to different analytical techniques to ascertain their physical and chemical properties. This comprehensive analysis aims to inform the formulation process for potential cosmetic applications.

Sample Compositions

This document, however, contains extensive observations and experimental details that might challenge simple data extraction processes.

Instrumentation and Methodology

Table 1: Instrument Utilization

| Instrument | Sample Composition | Observation/Measurement | Unit | Additional Info |
|---|---|---|---|---|
| Rheometer R-4500 | Almond Oil, Beeswax | Viscosity | Pa-s | Rheological properties |
| FTIR Spectrometer FTIR-8400 | Jojoba Oil, Cetyl Alcohol, Glycerin | Spectral peaks | 1/cm | Chemical bond identification |
| Ion Chromatograph IC-2100 | Coconut Oil | Ion Concentration | mM | Ionic compound analysis |
| Mass Spectrometer MS-20 | Coconut Oil, Glycerin | Mass-to-Charge Ratio | m/z | Molecular characterization |
| Centrifuge X100 | Jojoba Oil, Gum | Rotation Speed | RPM | Separation efficiency |
| Gas Chromatograph GC-2010 | Almond Oil, Beeswax | Concentration | ppm | Volatile component analysis |
| Viscometer VS-300 | Almond Oil, Beeswax, Vitamin E | Viscosity | cP | Flow behavior assessment |

Results and Discussion

Rheological Analysis

Utilizing theRheometer R-4500, the viscosity of the Almond Oil and Beeswax mixture was calculated to be precisely 345

Pa-s. This high viscosity indicates a substantial thickening effect, likely due to the wax component. Comparatively, theViscometer VS-300recorded the viscosity of a more complex mixture including Vitamin E as 7147.9 cP, demonstrating enhanced structural integrity.

## Spectral and Ionic Analysis

TheFTIR Spectrometer FTIR-8400revealed significant spectral peaks at 1250 1/cm when analyzing the Jojoba Oil, Cetyl Alcohol, and Glycerin mixture. These peaks correlate with typical functional groups such as esters and alcohols, which are prevalent in moisturizing products.

In contrast, theIon Chromatograph IC-2100, applied to pure Coconut Oil, indicated an ion concentration of 0.85 mM. While modest, it confirms the presence of certain ionic species possibly due to processing elements.

## Mass Spectrometry and Centrifugation

TheMass Spectrometer MS-20analyzed the Coconut Oil and Glycerin mixture, providing a mass-to-charge ratio of 890 m/z. This hints at larger molecular structures, potentially resulting from glycerin's complex molecular weight.

Centrifugation, performed with theCentrifuge X100on a Jojoba Oil and Gum mixture, achieved a separation speed of 13000 RPM. This highlights the excellent separation efficiency suited for high-speed emulsion formation.

## Gas Chromatography

The volatile component analysis viaGas Chromatograph GC-2010of the Almond Oil and Beeswax mixture registered a concentration of 5.6 ppm, indicating trace volatiles suitable for aromatic formulations.

## Conclusion

These investigations collectively help create a nuanced understanding of the behaviors and characteristics of various cosmetic formulations. Each analytical technique contributes unique insights, from molecular composition and viscosity to ionic presence and volatility. Despite scattered and complex data presentation, the integration of these findings can lead to optimized product formulations.