Lab Report: Analysis of Cosmetic Ingredient Mixtures

Report ID:1754Date:[Insert Date Here]Laboratory Personnel:[Insert Names Here]

Abstract

This report provides a comprehensive analysis of various mixtures containing cosmetic ingredients. Advanced instrumentation, including Nuclear Magnetic Resonance (NMR), Rheometry, High-Performance Liquid Chromatography (HPLC), Fourier-Transform Infrared Spectroscopy (FTIR), and Viscometry, were employed to determine the properties of each mixture under investigation.

Introduction

The experiments conducted aim to characterize the physico-chemical properties of different mixtures, each comprising oils with additional cosmetic ingredients. The goal is to assess the suitability of these mixtures for potential use in skincare formulations. Key measurements included viscosity, concentration, and purity, along with detailed observations from spectroscopic and chromatographic analyses.

Experimental Methods

Instrumentation and Samples

Sample Preparation

Each sample was prepared by thoroughly mixing the components to ensure a homogeneous solution. Special attention was paid to maintaining consistent environmental conditions during all measurements.

Results and Discussion

Spectrometric Analysis

NMR Observations:

Mixture (Almond Oil, Cetyl Alcohol, Vitamin E):

Table 1: NMR Results

|  |  |
| --- | --- |
| **Sample** | **Chemical Shifts (ppm)** |
| Almond Oil + Cetyl Alcohol + Vitamin E | 10, 15 |

FTIR Observations:

Mixture (Jojoba Oil, Cetyl Alcohol):

Table 2: FTIR Results

|  |  |
| --- | --- |
| **Sample** | **Major Absorption Bands (1/cm)** |
| Jojoba Oil + Cetyl Alcohol | 3500 |

Viscosity Measurements

Rheometer and Viscometer Results:

Mixtures, for example, Jojoba Oil with Gum and Glycerin, displayed viscosities of 450 Pa-s and 1951.56 cP respectively, indicating significant discrepancies in flow characteristics.

Table 3: Rheology and Viscosity Data

|  |  |
| --- | --- |
| **Sample** | **Viscosity (Pa-s or cP)** |
| Jojoba Oil + Gum + Glycerin | 450 Pa-s |
| Jojoba Oil + Beeswax + Glycerin | 2829.76 cP |
| Jojoba Oil + Gum + Glycerin | 1951.56 cP |

Chromatographic and PCR Analysis

HPLC Findings:

Concentrations noted were highest in Coconut Oil mixtures with Vitamin E, measured at 50 mg/L.

PCR Observation:

An amplification cycle threshold (Ct) value of 25 was recorded, but relevance was not further pursued.

Table 4: HPLC and PCR Data

|  |  |  |
| --- | --- | --- |
| **Sample** | **Concentration (mg/L)** | **PCR Ct Value** |
| Coconut Oil + Vitamin E | 50 | -- |
| Jojoba Oil + Beeswax | 300 | 25 |

Conclusion

The results provide a robust characterization of each mixture, affirming their potential applicability in cosmetic formulations. The distinct variance in viscosities and chemical profiles underscores the need for customized preparation processes in real-world applications.

Miscellaneous Observations

Notes and Acknowledgments

This work was supported by contributions from several laboratory partners. We acknowledge the technical support staff for maintaining the equipment used in this study.

This report contains information critical to understanding the complex interplay between various ingredients used in cosmetic formulations. Further exploration and optimization of these mixtures will foster enhanced product development.