Lab Report: Multicomponent Analysis of Cosmetic Oils and Additives

Report ID: Report\_1821Objective: To analyze the properties of various cosmetic oil mixtures and their interactions with different additives using a range of analytical techniques.

Introduction

In this study, we examined the physicochemical characteristics of diverse mixtures involving oils such as Coconut Oil, Almond Oil, and Jojoba Oil in combination with various additives including Cetyl Alcohol, Glycerin, Beeswax, Gum, and Vitamin E. The testing was conducted using advanced instrumentation to provide detailed insights into the behavior of these mixtures under different conditions. The results offer enriched data for potential formulation refinement in cosmetic applications.

Experimental Section

Sample Preparation

Each test sample was prepared by combining specified proportions of oils and additives, ensuring homogeneity prior to analysis. The mixtures were then divided and subjected to the following analytical equipment:

Analytical Techniques

Measurement: 25 Ct

HPLC Evaluation

Samples:

Centrifugation

Speed Measurements:

FTIR Spectroscopy

Measurement: 650 1/cm

Rheological Assessment

Viscosity: 400 Pa-s

Conductivity Testing

Conductivity: 1500 uS/cm

Gas Chromatography

Measurement: 75 ppm

Viscometry

Results and Observations

Table 1: PCR and HPLC Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample ID** | **Equipment Used** | **Components** | **Measurement** | **Unit** |
| S1 | PCR Machine PCR-96 | Coconut Oil, Cetyl Alcohol, Glycerin | 25.0 | Ct |
| S2 | HPLC System HPLC-9000 | Coconut Oil, Gum | 50.2 | mg/L |
| S3 | HPLC System HPLC-9000 | Jojoba Oil, Gum, Vitamin E | 320.0 | mg/L |

Table 2: Physical and Rheological Properties

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample ID** | **Testing Device** | **Mixture Description** | **Measurement** | **Unit** |
| S4 | Centrifuge X100 | Coconut Oil | 12000.0 | RPM |
| S5 | Centrifuge X100 | Jojoba Oil, Glycerin | 11000.0 | RPM |
| S6 | Rheometer R-4500 | Coconut Oil, Cetyl Alcohol, Vitamin E | 400.0 | Pa-s |
| S7 | Viscometer VS-300 | Coconut Oil, Cetyl Alcohol, Glycerin | 5252.91 | cP |

Note on FTIR and Conductivity:

The FTIR spectral data revealed characteristic peaks for the beeswax component within the Coconut Oil mixture, notably at 650 1/cm, indicating possible structural interactions. Concurrently, the conductivity measurements for Almond Oil combined with Gum recorded 1500 uS/cm using a Conductivity Meter CM-215, suggesting ionic mobility likely due to the gum's solvation properties.

Conclusion

Utilizing advanced analytical methodologies, this study discerned significant variabilities among the test samples, highlighting differences in component interactions. The Rheometer detected high viscosity in mixtures involving Coconut Oil and Vitamin E, whereas the HPLC results underscored the notable solubility of Vitamin E in combination with Jojoba Oil.

Irrelevant Information:  
During one of the analyses, a power outage resulted in temporary measurement delays. Additionally, a misplaced beaker was reported but did not impact the final outcomes.

Further studies are recommended to explore thermal behavior under varied conditions using techniques like Differential Scanning Calorimetry (DSC) which were unavailable during this session.

This report provides essential insights bridging raw material analysis to applied cosmetic formulation development, fostering innovation and improved product profiles in the cosmetics industry.