Laboratory Report: Analysis of Cosmetic Oil Mixtures

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IntroductionThis report presents the detailed analysis of several cosmetic oil mixtures using various instruments. Each set of ingredients was treated as a unique test sample. The analysis focused on determining specific properties and components of these mixtures.

Experimentation Overview

A collection of tests were conducted using advanced laboratory equipment including FTIR Spectrometer, NMR Spectrometer, Thermocycler, Ion Chromatograph, UV-Vis Spectrophotometer, and Viscometer. Each instrument was employed to examine different aspects of the samples prepared.

Table 1: FTIR Spectrometer AnalysisThe FTIR Spectrometer FTIR-8400 was used to measure specific frequencies associated with functional groups in the samples. Data collected for this parameter is crucial since it represents the vibrational transitions within molecules:

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| --- | --- |
| **Sample Composition** | **Wavenumber (1/cm)** |
| Almond Oil | 3456 |
| Coconut Oil, Beeswax | 2950 |

Observation:Strong absorption peaks were observed that are indicative of hydroxyl and carbonyl functionalities.

Results of NMR Spectrometer Analysis

Introduction to NMR Findings: Using the NMR Spectrometer NMR-500, the samples' chemical environments were analyzed spurred by information regarding nuclear magnetic resonance phenomena.

Table 2: NMR Spectrometry Results

|  |  |
| --- | --- |
| **Sample Composition** | **Chemical Shift (ppm)** |
| Jojoba Oil, Cetyl Alcohol, Glycerin | 15.6 |
| Almond Oil, Cetyl Alcohol, Vitamin E | 5.4 |

Observation:The shifts indicate unique hydrogen environments within esters and alcohols.

Irrelevant Information: A bird was seen flying past the laboratory window during the experiments; surprisingly, its presence seemed to correlate with some of the most intriguing data captured.

Thermal Analysis Using ThermocyclerThe Thermocycler TC-5000 evaluated thermal properties such as phase transition temperatures of the selected mixtures.

Table 3: Thermally Induced Changes

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| --- | --- |
| **Sample Composition** | **Temperature (°C)** |
| Jojoba Oil, Cetyl Alcohol | 67 |
| Coconut Oil, Glycerin | 24 |

Observation:Endothermic transitions suggest crystalline dissolution at the measured temperatures.

Ion Chromatography Elucidation

Discussion on Minerals: Ion Chromatograph IC-2100 assessed millimolar concentrations of particular ions through aqueous extraction.

Table 4: IC Detection Results

|  |  |
| --- | --- |
| **Sample Composition** | **Concentration (mM)** |
| Coconut Oil, Cetyl Alcohol, Vitamin E | 0.056 |
| Almond Oil, Gum | 0.045 |

Observation:Detection of trace elements revealed through de-convoluted spectra profiles.

UV-Vis Spectrophotometry Findings:   
The UV-Vis Spectrophotometer UV-2600 provided absorbance profiles, which are pivotal in pigment characterization.

|  |  |
| --- | --- |
| **Sample Composition** | **Absorbance (Abs)** |
| Jojoba Oil, Gum, Vitamin E | 1.8 |

Observation:Strong absorbance suggests conjugated systems or chromophoric regions with extensive delocalization.

Viscosity Measurements

Table 5: Viscosity Characteristics

|  |  |
| --- | --- |
| **Sample Composition** | **Viscosity (cP)** |
| Jojoba Oil, Beeswax, Glycerin | 2701.61 |
| Coconut Oil, Glycerin | 4967.28 |

Conclusion:Results obtained provide substantial insights into the physicochemical properties of oil-based cosmetic mixtures. While some incongruent data was encountered (e.g., viscosity disparities attributed potentially to ambient conditions), the findings offer a transparent view of material behaviors. Future work might include comparative analyses with extended sample compositions for more comprehensive formulation efficiencies.

Notation of Irrelevant Behavioral Study: Scientists noted a preference for almond-scented candles during the operation of the Ion Chromatograph, although no correlation to performance was established.