Laboratory Analysis Report #2287

Overview

The following report outlines a series of experiments conducted using a variety of analytical instruments. These tests were performed on complex mixtures of ingredients, including combinations of Coconut Oil, Almond Oil, Beeswax, Cetyl Alcohol, Gum, Glycerin, and Vitamin E. The analyses provide insight into the chemical composition, purity, and characteristics of these mixtures.

Analytical Instruments Utilized

Observations and Measurements

Gas Chromatography Analysis

Gas Chromatography was performed using theGC-2010, measuring the concentration of various components within the test samples in parts per million (ppm). Below are the recorded observations:

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Measurement** | **Units** |
| Coconut Oil, Beeswax, Vitamin E | GC-2010 | 215 | ppm |
| Almond Oil, Cetyl Alcohol, Vita | GC-2010 | 480 | ppm |
| Coconut Oil, Cetyl Alcohol, Vit | GC-2010 | 360 | ppm |

Liquid Chromatography Assessment

TheLC-400was employed to determine the concentration in micrograms per milliliter (ug/mL). It enhances our understanding of molecular interactions in the mixtures:

|  |  |  |  |
| --- | --- | --- | --- |
| **Ingredients** | **Device** | **Amount** | **Units** |
| Coconut Oil, Beeswax, Vitamin E | LC-400 | 350 | ug/mL |
| Almond, Cetyl Alcohol, Vitamin E | LC-400 | 475 | ug/mL |
| Coconut, Cetyl Alcohol, Vitamin E | LC-400 | 270 | ug/mL |

Centrifugal Force Verification

TheCentrifuge X100spun the mixtures to evaluate their stability and separation at various speeds measured in Revolutions Per Minute (RPM):

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Centrifugal Device** | **Speed** | **Unit** |
| Coconut Oil, Beeswax, Vitamin E | Centrifuge X100 | 8000 | RPM |
| Almond Oil, Cetyl Alcohol, Vitamin E | Centrifuge X100 | 12000 | RPM |
| Coconut, Cetyl Alcohol, Vitamin E | Centrifuge X100 | 9500 | RPM |

Mass Spectrometry Examination

Through the powerfulMS-20, mass-to-charge ratios (m/z) of molecules were captured, revealing the molecular weight and structural information:

|  |  |  |  |
| --- | --- | --- | --- |
| **Formulation Composition** | **Spectrometer** | **m/z** | **Unit** |
| Coconut Oil, Beeswax, Vitamin E | MS-20 | 1250 | m/z |
| Almond Oil, Cetyl Alcohol, Vitamin E | MS-20 | 1750 | m/z |
| Coconut, Cetyl Alcohol, Vitamin E | MS-20 | 1450 | m/z |

FTIR Spectroscopy Summary

TheFTIR-8400spectroscopy was applied to interpret functional groups present in mixtures via wavenumber (1/cm):

|  |  |  |  |
| --- | --- | --- | --- |
| **Blend** | **FTIR Instrument** | **Wavenumber** | **Unit** |
| Coconut Oil, Beeswax, Vitamin E | FTIR-8400 | 2850 | 1/cm |
| Almond Oil, Cetyl Alcohol, Vitamin E | FTIR-8400 | 3100 | 1/cm |
| Coconut, Cetyl Alcohol, Vitamin E | FTIR-8400 | 3450 | 1/cm |

Viscosity Determination

TheVS-300Viscometer scrutinized the viscosity of the mixtures, expressed in centipoise (cP):

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture Details** | **Viscometer** | **Viscosity** | **Units** |
| Coconut, Cetyl Alco | VS-300 | 5081.89 | cP |
| Almond Oil | VS-300 | 7407.99 | cP |

Detailed Descriptions

Irrelevant to the core findings, a fascinating pattern was observed in the correlations between molecular weights and viscosity. While unrelated, the distinct variations imply broader implications in emulsion stability. Such nuances offer grounds for in-depth studies, focusing perhaps on how physical forces like centrifuge speeds might impact polymerization.

Irrelevant Findings

We observe varied performance across instruments, providing comprehensive profiles of the cosmetic and pharmaceutical relevance in formulations. The multi-instrumental approach facilitates in-depth understanding, yet occasionally acknowledges discrepancies worth exploring further, perhaps steering towards systematic calibration enhancements.

For deeper assessments or access to raw chromatograms, mass spectra, or further data interpretations, contact the analytical team.