Lab Report 677: Analysis of Various Oil-Based Mixtures

Introduction

This report outlines the detailed experimental analysis conducted on various oil-based mixtures utilizing a range of laboratory instruments. The mixtures, made up of combinations such as Coconut Oil with Glycerin and Jojoba Oil with Beeswax, were subjected to different tests to assess properties including temperature effects, concentrations, mass-to-charge ratios, and more. Various instruments, ranging from thermocyclers to spectrometers, were employed to get comprehensive insights.

Mixtures Tested

Methodology

Instruments Employed and Set Parameters

The following instruments were used, with each test adhering to specific parameters:

Almond Oil:37°C

Ion Chromatograph (IC-2100)for concentration determination:

Coconut Oil, Gum:8.5 mM

Mass Spectrometer (MS-20)for analyzing mass-to-charge ratios:

Jojoba Oil, Cetyl Alcohol, Glycerin:1200 m/z

PCR Machine (PCR-96)for amplification count:

Coconut Oil:25 Ct

Spectrometer (Alpha-300)for wavelength absorption:

Jojoba Oil, Beeswax, Vitamin E:600 nm

Microplate Reader (MRX)for optical density measurement:

Jojoba Oil, Glycerin:1.8 OD

Centrifuge (X100)for rotational speed analysis:

Almond Oil, Beeswax, Vitamin E:5000 RPM

Viscometer (VS-300)for viscosity measurement:

Observations and Results

Table 1: Temperature and Concentration Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Parameter** | **Value** | **Units** |
| Coconut Oil, Glycerin | TC-5000 | Temp | 50.0 | °C |
| Coconut Oil, Gum | IC-2100 | Conc | 8.5 | mM |
| Almond Oil | TC-5000 | Temp | 37.0 | °C |
| Coconut Oil | PCR-96 | Count | 25.0 | Ct |

Table 2: Spectroscopic and Mass Spectrometric Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Parameter** | **Value** | **Units** |
| Jojoba, Cetyl, Glycerin | MS-20 | m/z | 1200.0 | m/z |
| Jojoba, Beeswax, Vitamin E | Alpha-300 | Wavelength | 600.0 | nm |
| Jojoba Oil, Glycerin | MRX | OD | 1.8 | OD |

Table 3: Physical Property Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mixture** | **Instrument** | **Parameter** | **Value** | **Units** |
| Almond, Beeswax, Vitamin E | X100 | RPM | 5000.0 | RPM |
| Jojoba, Gum, Vitamin E | VS-300 | Viscosity | 1944.49 | cP |
| Coconut, Cetyl Alcohol | VS-300 | Viscosity | 5132.93 | cP |

Detailed Observations

During thethermocycling test, Coconut Oil mixed with Glycerin showed significant stability at 50°C. This temperature was critical as it simulates environmental conditions. Similarly, Almond Oil executed at 37°C reflected a potential use in skincare formulations at body temperature.

TheIon Chromatographresults provided insights into the ion concentration, revealing an 8.5 mM concentration for the Coconut Oil-Gum mixture, implying enhanced emulsification properties useful in cosmetic formulation.

The intricate usage ofMass Spectrometryon the Jojoba Oil, Cetyl Alcohol, and Glycerin mixture showed a mass-to-charge ratio of 1200 m/z, with potential implications in phasing out molecular fragmentation.

Discussion

The outcomes from these sets of experiments suggest that the oils, either used singularly or in blends, can be effectively assessed using different analytical methodologies. The variance in viscosity as observed in the Jojoba and Coconut mixtures implies a direct correlation to their potential stability and application in diverse product formulations.

Complex Conclusion:

It is evident that these mixtures present versatile functional properties, deemed satisfactory for multiple industrial applications including cosmetics, pharmaceuticals, and food industries. Considerations for future explorations could include more precise control over reaction variables and expanding experimental conditions to wider ranges.

This report, intentionally layered with intricate descriptions and sporadically intertwined with less relevant yet descriptive parts, poses an immersive evaluation of oil-centric mixtures while highlighting the technical prowess essential in sophisticated laboratory environments.