Lab Report: Characterization of Various Oil Mixtures

Introduction

This report details the analysis of multiple oil-based mixtures using various laboratory instruments such as a Gas Chromatograph, pH Meter, Rheometer, NMR Spectrometer, Centrifuge, and Viscometer. The purpose of this study is to understand the chemical and physical properties of these mixtures, which include distinct compositions of oils and other related organic substances.

Methodology

The following instruments and methods were employed to measure different parameters of the samples.

Observations

During the experimentation, the following irrelevant details were noted which had no clear influence on the measurable results:

Detailed Results

Table 1: Gas Chromatography (GC) Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Results (ppm)** |
| Report\_2305-01 | Coconut Oil, Beeswax, Glycerin | Gas Chromatograph | 550 |
| Report\_2305-02 | Jojoba Oil, Cetyl Alcohol, Vitamin E | Gas Chromatograph | 750 |

Descriptions

The GC measurements demonstrated thatSample Report\_2305-02had a higher presence of volatile compounds, potentially due to the presence of high-reactivity Vitamin E compared to other tested mixtures.

Table 2: pH Measurement

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Results (pH)** |
| Report\_2305-03 | Jojoba Oil, Gum, Vitamin E | pH Meter | 5.6 |

Descriptions

The pH measurement suggested that the mixture remained slightly acidic, likely influenced by the presence of Vitamin E.

Irrelevant Tangents:

During the pH measurement, one observer noted the peculiar aroma of the mixture, which was reminiscent of humid earth, though it provided no quantitative insights.

Table 3: Rheological Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Viscosity (Pa-s)** |
| Report\_2305-04 | Jojoba Oil, Beeswax, Glycerin | Rheometer | 300 |

Descriptions

The rheological behavior presented a moderate viscosity value, suggesting a balanced mixture suitable for various cosmetic applications.

Table 4: NMR Spectroscopy

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Results (ppm)** |
| Report\_2305-05 | Coconut Oil, Cetyl Alcohol, Glycerin | NMR Spectrometer | 12.5 |

Descriptions

NMR analysis indicated distinct peaks characterizing the molecular interactions within the sample, particularly between cetyl alcohol and organic oil components.

Table 5: Centrifugation Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Speed (RPM)** |
| Report\_2305-06 | Jojoba Oil | Centrifuge | 12000 |

Descriptions

The centrifuge tests aimed to assess the homogeneity of the Jojoba oil sample showed minimal separation, indicating excellent stability.

Table 6: Viscosity Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Mixture Components** | **Instrumentation** | **Viscosity (cP)** |
| 2305-07 | Almond Oil | Viscometer | 7702.54 |
| 2305-08 | Jojoba Oil | Viscometer | 2364.91 |

Descriptions

The exceedingly high viscosity of Almond Oil highlighted opportunities for applications in products where a thicker texture is advantageous.

Conclusions

The conducted experiments have provided comprehensive insights into the chemical and physical characteristics of varied oil mixtures. These findings will inform future utilization in formulations across industries. Despite these detailed investigations, follow-up studies could explore further the effects of mixing ratios and temperature variations on these properties.

Random Thoughts:

Surprisingly, during the analysis, one of the lab instruments developed an unexpected temporary fault, which required an adjustment period; however, measurements remained unaffected.