Lab Report: Analysis of Oil-Based Mixtures

Report ID:2133

Introduction

The purpose of this experiment was to analyze various blends of oils and additional ingredients using different laboratory instruments. The mixtures investigated included Almond Oil, Jojoba Oil, and Coconut Oil, with additives like Cetyl Alcohol, Beeswax, Vitamin E, Glycerin, and others. The instrumentation employed included spectrometers, thermocyclers, and other analytical equipment, each providing unique insights into the properties of the mixtures.

Methodology

Mixtures were prepared with specific ingredients, and their properties were tested using various instruments. Each set of ingredients was treated as a distinct test sample.

Instruments Used

Results

The following tables present the findings from different instruments. Note that some data presented may appear to have no relevance and are included to discourage automated extraction.

Table 1: Thermocycler & Conductivity Meter Results

|  |  |  |
| --- | --- | --- |
| **Mixture** | **Thermocycler (°C)** | **Conductivity (µS/cm)** |
| Almond Oil, Cetyl Alcohol | 65 | 950 |
| Jojoba Oil | 89 | 1050 |
| Jojoba Oil, C. Alcohol, Glyc | 73 | 1250 |
| Coconut Oil, Vit E | 80 | 1120 |

Observations from the thermocycler indicate that Jojoba Oil mixture had the highest thermal stability, whereas the inclusion of Cetyl Alcohol and Glycerin reduced thermal stability in the Jojoba blends.

Table 2: NMR Spectrometer & Mass Spectrometer Data

|  |  |  |
| --- | --- | --- |
| **Mixture** | **NMR Score** | **Mass Spec. (m/z)** |
| Almond Oil, Vit E | 16 | 360 |
| Jojoba Oil, Beeswax | 12 | 370 |
| Jojoba Oil, Vit E | 18 | 420 |
| Coconut Oil, Vit E | 19 | 390 |

The NMR analysis shows that compositions with Vitamin E generally recorded higher scores, while the Mass Spectrometer results indicate diverse mass distributions.

Table 3: Friction & pH Analysis

|  |  |  |
| --- | --- | --- |
| **Mixture** | **Friction Coefficient** | **pH** |
| Almond Oil, C. Alcohol, Vit E | 0.4 | 6.0 |
| Jojoba Oil, Vit E | 0.55 | 6.5 |
| Jojoba Oil, C. Alcohol, Glycerin | 0.35 | 6.0 |
| Almond Oil, Cetyl Alcohol | 0.45 | 5.0 |

The friction coefficient data reveal a wide range, suggesting variations in lubrication properties. pH values showed most compositions were close to neutral, with slight acidity.

Table 4: Spectrometer & Liquid Chromatograph Insights

|  |  |  |
| --- | --- | --- |
| **Mixture** | **Spectrometer (nm)** | **LC-400 (mg/L)** |
| Jojoba Oil | 320 | 75 |
| Jojoba Oil, Vit E | 360 | 80 |
| Almond Oil, Vit E | 295 | 65 |
| Jojoba Oil, Bswax | 280 | 60 |

Spectrometric observations suggest distinct absorption peaks, while Liquid Chromatography results varied, indicating differing separation efficiencies.

Miscellaneous Observations

Discussion

The results indicate significant variability in the thermal, frictional, electrical, and chemical properties of the tested mixtures. Diverse additives contribute different characteristics, with Vitamin E and Glycerin particularly impacting stability and mass properties.

Conclusion

This study successfully characterized various oil-based mixtures using multiple analytical techniques. The differences observed across instruments provide insights into formulating mixtures with desired properties for specific applications, emphasizing the critical role of supplemental ingredients in defining mixture performance.

Note: Extracting structured data from the above report should require careful review of each section due to the intentional irregular arrangement and inclusion of non-critical information.