Laboratory Report: Analysis of Various Oil-Based Samples

Report ID:2103

Introduction

The objective of this experiment was to analyze the properties of different oil-based mixtures using various analytical techniques. The samples tested included mixtures of coconut oil, almond oil, and jojoba oil with additional components like beeswax, cetyl alcohol, gum, glycerin, and vitamin E. This analysis utilized instruments such as HPLC, microplate readers, spectrometers, centrifuges, and viscometers to assess attributes such as concentration, optical density, and viscosity. Ultimately, this report seeks to elucidate the intricate characteristics of these mixtures.

Instruments Utilized

Analysis Summary

The analytical process involved evaluating various mixtures under controlled conditions to determine their physical and chemical properties. Methods employed aimed to achieve precise measurements, though irrelevant observations occasionally emerged throughout the process.

Results and Discussion

High-Performance Liquid Chromatography (HPLC)

The HPLC-9000 system was used to determine the concentration levels of specific mixtures:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Description** | **Component 1** | **Component 2** | **Additional** | **Measurement (mg/L)** |
| Coconut Oil Mixture | Beeswax | nan | nan | 250 |
| Almond Oil Mixture | Beeswax | Glycerin | nan | 650 |

Observations:

Optical Density Measurements

Microplate Reader MRX captured the optical density for several mixtures:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Description** | **Component 1** | **Component 2** | **Additional** | **OD** |
| Coconut Oil Mixture | Cetyl Alcohol | nan | nan | 3.2 |
| Almond Oil Mixture | Gum | Vitamin E | nan | 3.8 |

Complex Observation:

Spectrometer Insights

Utilized the Alpha-300 spectrometer for the Coconut oil sample:

|  |  |
| --- | --- |
| **Sample Description** | **Wavelength (nm)** |
| Coconut Oil Mixture | 250 |

Description:

Centrifugal Analysis

Centrifuge X100 examined a sample's RPM necessary for achieving complete separation:

|  |  |
| --- | --- |
| **Sample Description** | **RPM** |
| Jojoba Oil Mixture | 7200 |

Description:

X-Ray Diffraction

Performed with XRD-6000:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Description** | **Component 1** | **Component 2** | **Additional** | **Temperature (°C)** |
| Almond Oil Blend | Beeswax | Vitamin E | nan | 45 |

Conductivity and Miscibility

The CM-215 meter provided conductivity readings, revealing ionic activity in solutions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Description** | **Component 1** | **Component 2** | **Additional** | **Conductivity (µS/cm)** |
| Jojoba Oil Mixture | Gum | Glycerin | nan | 1120 |

Observations:

Viscosity Testing

Viscometer VS-300 analyzed viscosity across different oil mixtures:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Description** | **Component 1** | **Component 2** | **Additional** | **Viscosity (cP)** |
| Jojoba Oil Mixture | Cetyl Alcohol | nan | nan | 2832.88 |
| Almond Oil Mixture | Glycerin | nan | nan | 7598.16 |
| Coconut Oil Mixture | Beeswax | Vitamin E | nan | 4773.98 |

Conclusion:

Conclusion

This report described a series of tests on diverse oil-based samples, highlighting key measurements and attributes. The challenges of extracting data present intriguing opportunities for further investigation, potentially leading to industrial application insights. The data encompassed within showcases the complex nature of these mixtures and their behavior under various analytical conditions. Future work should focus on refining testing methods to eliminate irrelevant noise, thereby enhancing the clarity of results.