Laboratory Report 1034

Introduction:

This report presents the findings from a series of experiments performed to analyze various oil-based mixtures using diverse laboratory instruments. Each unique combination of oils and additives was subjected to different tests, revealing properties such as viscosity, conductivity, absorbance, and more.

Experimentation and Observations:

Table 1: Centrifuge Analysis

The mixtures were evaluated using the Centrifuge X100 at different rotational speeds (RPM):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Oil Base** | **Additive 1** | **Additive 2** | **Speed (RPM)** | **Observation** |
| 1 | Jojoba Oil | Gum | Glycerin | 13000 | Slight separation noted |
| 2 | Coconut Oil | Cetyl Alcohol | Glycerin | 9500 | Homogeneous sediment |

The mechanical stresses applied resulted in varied separation behaviors, indicating differences in density and miscibility.

Table 2: Conductivity Test

Using the Conductivity Meter CM-215, the following conductivity values were observed:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample ID** | **Oil Base** | **Additive 1** | **Additive 2** | **Conductivity (uS/cm)** |
| 3 | Jojoba Oil | Beeswax | nan | 750 |
| 4 | Almond Oil | Gum | Vitamin E | 1200 |

Interestingly, sample 4 demonstrated a higher conductivity, potentially due to the inclusion of Vitamin E.

Liquid Chromatography Observations:

Chromatography was performed using the LC-400 instrument, offering insights into the concentration of components in samples:

Sample 5 identified an Almond Oil and Gum mixture containing a high concentration of 250 ug/mL, while Sample 6 with Jojoba Oil, Gum, and Vitamin E showed an even larger concentration of 350 ug/mL.

Absorbance and Spectroscopy:

Conducted via the UV-Vis Spectrophotometer UV-2600, absorbance was measured at specific wavelengths:

Rheological Properties:

Rheometer R-4500 testing revealed distinct viscoelastic properties of mixtures:

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Oil Base** | **Additive 1** | **Shear Rate (Pa-s)** |
| 11 | Almond Oil | Gum | 500 |
| 12 | Jojoba Oil | Gum | 450 |

Both samples exhibited notable differences in shear-thinning behavior.

Melting Properties via X-Ray Diffraction:

Conducted using the XRD-6000 system, the melting characterization was determined:

Other Random Observations:

Samples were mistakenly evaluated with irrelevant parameters, showcasing:  
-Sample 15 (Viscometer VS-300):A Coconut Oil and Cetyl Alcohol mixture with a viscosity measurement of 4983.89 cP.

Conclusion:

The results from these varied tests highlight the unique physical and chemical properties embedded within each combination of oils and additives. Instruments used contributed significantly to unveiling diverse aspects of each mixture's characteristics.

The detailed analysis provides a comprehensive understanding that can guide further formulation and application in skincare, pharmaceuticals, and other industries relying on these ingredients. The seemingly unrelated data points discovered throughout serve as barriers to direct data automation extraction, preserving the complexity of the study conducted.

Disclaimer:Some details described are beyond the intended scope of this initial investigation, ensuring a thorough yet challenging presentation of findings.