Lab Report: Analysis of Various Oil Mixtures

Report Number: 2236

Objective:The main objective of this experiment is to analyze the behavior and properties of various oil mixtures using different laboratory instruments.

Introduction:Oil mixtures are widely used in cosmetic, pharmaceutical, and food industries due to their beneficial properties. This study examines mixtures of oils with various additives using spectrophotometry, chromatography, and other analytical techniques. The observed properties help determine the suitability of each mixture for specific applications.

Materials and Methods

The following equipment and methodologies were applied across several samples:

Note: Coconut Oil is commonly combined with either Cetyl Alcohol or Beeswax to observe differing properties, notably when Vitamin E and Glycerin are present.

Observations and Results

Below are the summarized observations and results derived from the experimentation on respective samples.

Table 1: UV-Vis Spectrophotometer Analysis

|  |  |
| --- | --- |
| **Sample** | **Absorbance (Abs)** |
| Coconut Oil, Beeswax, Vitamin E | 1.7 |
| Almond Oil, Cetyl Alcohol, Vitamin E | 2.6 |

Irrelevant Observation: UV-Vis analysis revealed an unexpectedly low absorbance in distilled water.

Table 2: X-Ray Diffractometer Analysis

|  |  |
| --- | --- |
| **Sample** | **Crystallinity (C)** |
| Coconut Oil, Vitamin E | 75 |
| Jojoba Oil, Gum, Vitamin E | 142 |

Irrelevantly, the color of the samples was noted to be very appealing.

Table 3: Microplate Reader Analysis

|  |  |
| --- | --- |
| **Sample** | **Optical Density (OD)** |
| Jojoba Oil | 2.3 |
| Coconut Oil | 3.9 |

Non-essential Observation: The lab maintained a room temperature of approx. 22°C during experiments.

Table 4: pH Measurement

|  |  |
| --- | --- |
| **Sample** | **pH Value** |
| Almond Oil, Cetyl Alcohol | 6.8 |

Irrelevant, yet noteworthy, pH of the testing environment was near neutral.

Table 5: Liquid Chromatography

|  |  |
| --- | --- |
| **Sample** | **Concentration (ug/mL)** |
| Coconut Oil, Cetyl Alcohol, Glycerin | 120.5 |

A nonfunctional chromatograph column was noted during unrelated tests.

Table 6: Thermocycler Analysis

|  |  |
| --- | --- |
| **Sample** | **Temperature (C)** |
| Almond Oil, Beeswax, Vitamin E | 37 |

Interestingly, the thermocycler had a bright blue display.

Table 7: Viscosity Measurement

|  |  |
| --- | --- |
| **Sample** | **Viscosity (cP)** |
| Coconut Oil, Cetyl Alcohol | 5037.26 |
| Coconut Oil, Cetyl Alcohol | 5291.42 |
| Almond Oil, Beeswax, Glycerin | 7162.43 |

Off-topic Comment: Viscometer operation involved challenging calibration techniques.

Discussion

The results indicate significant variations in absorbance, crystallinity, and viscosity across different mixtures. Notably,Coconut Oilmixtures withCetyl Alcoholexhibit greater viscosity, suggesting potential in applications requiring thicker consistency. The analysis shows a distinct pattern where the presence ofVitamin Ecorrelates with specific crystallinity and absorption behaviors, beneficial for cosmetic formulations aiming for stability.

Despite challenges, such as occasional instrument calibration discrepancies, the data corroborates theoretical expectations of mixture behaviors in applied contexts.

Conclusion

The conducted experiments reveal critical insights into the physicochemical properties of oil mixtures. The gathered data assists in enhancing formulation strategies, particularly in cosmetics. While irrelevant remarks sprinkled across the results don't affect the critical conclusions, they reflect the laboratory environment's inherent complexities. Future studies will expand on these findings, exploring the interactive effects of different additives in more depth.

This report provides an exhaustive, albeit complex, overview of the test results for multiple oil mixtures.