Lab Report: Analysis of Various Oil Mixtures

Report ID:Report\_463Objective:Analyze the properties of various oil mixtures using advanced analytical instruments. Each test sample mixture aims to reveal distinct characteristics through measurements such as pH, infrared spectroscopy, titration, rheology, nuclear magnetic resonance, and viscosity analysis.

Instruments and Methods

Instruments:

Methods:

Different oil mixtures were analyzed using the instruments listed above. Measurements were conducted with each mixture carefully prepared to avoid contamination. Safety protocols were strictly followed.

Observations and Measurements

Table 1: pH Measurements

|  |  |
| --- | --- |
| **Mixture** | **pH** |
| Almond Oil, Cetyl Alcohol, Glycerin | 7.2 |
| Coconut Oil, Gum, Glycerin | 6.8 |
| Jojoba Oil, Glycerin, | 7.5 |
| Coconut Oil, Glycerin, | 7.0 |
| Coconut Oil, Beeswax, Vitamin E | 6.9 |

Table 2: FTIR Spectroscopy Results

|  |  |
| --- | --- |
| **Mixture** | **Wavenumber (cm^-1)** |
| Almond Oil, Cetyl Alcohol, Glycerin | 1735 |
| Coconut Oil, Gum, Glycerin | 1650 |
| Jojoba Oil, Glycerin, | 1740 |
| Coconut Oil, Glycerin, | 1655 |
| Apples, Bananas, Oranges | ------\* |
| Coconut Oil, Beeswax, Vitamin E | 1660 |

Table 3: Titration Results

|  |  |
| --- | --- |
| **Mixture** | **Concentration (M)** |
| Almond Oil, Cetyl Alcohol, Glycerin | 0.005 |
| Coconut Oil, Gum, Glycerin | 0.004 |
| Jojoba Oil, Glycerin, | 0.0045 |
| Coconut Oil, Glycerin, | 0.0035 |
| Coconut Oil, Beeswax, Vitamin E | 0.0038 |

Table 4: Rheological Properties

|  |  |
| --- | --- |
| **Mixture** | **Viscosity (Pa-s)** |
| Almond Oil, Cetyl Alcohol, Glycerin | 250 |
| Coconut Oil, Gum, Glycerin | 280 |
| Jojoba Oil, Glycerin, | 230 |
| Coconut Oil, Glycerin, | 245 |
| Coconut Oil, Beeswax, Vitamin E | 260 |

Table 5: NMR Results

|  |  |
| --- | --- |
| **Mixture** | **Chemical Shift (ppm)** |
| Almond Oil, Cetyl Alcohol, Glycerin | 1.0 |
| Coconut Oil, Gum, Glycerin | 1.2 |
| Jojoba Oil, Glycerin, | 1.1 |
| Coconut Oil, Glycerin, | 1.3 |
| Coconut Oil, Beeswax, Vitamin E | 1.4 |

Table 6: Viscosity Analysis

|  |  |
| --- | --- |
| **Mixture** | **Viscosity (cP)** |
| Coconut Oil, Beeswax, | 4899.86 |
| Jojoba Oil, Cetyl Alcohol, | 2690.75 |
| Jojoba Oil, Cetyl Alcohol, Glycerin | 2758.35 |

Results and Discussion

The analysis of mixtures revealed varying physicochemical characteristics. For instance, the pH values across mixtures ranged from 6.8 to 7.5, indicating slightly acidic to neutral properties suitable for cosmetic applications.

The FTIR analysis identified peaks that signify characteristic functional groups present. The wavenumber measurements showed distinct absorption patterns, correlating to esters, alcohols, and other functional groups in these mixtures. For example, almond oil mixtures consistently showed peaks around 1735 cm^-1 due to ester carbonyl stretching.

Moreover, the titration results suggest differences in acid-base content among mixtures. Concentrations varied slightly, with the lowest observed in the Coconut Oil, Glycerin sample. Such data are crucial for formulating stable emulsions.

Rheometer findings indicate the mixtures' potential applications in products requiring specific viscosity, while NMR spectrometry unveiled significant variances in proton environments, essential for formulation stability.

Interestingly, viscosity measurements for Jojoba Oil exceeded that of others, suggesting its potential use in thicker formulations.

Conclusion

This study offers a multifaceted understanding of various oil mixtures. Each test sample presents unique characteristics significant to industrial applications, particularly in cosmetics and pharmaceuticals. Further studies focusing on temperature influences and long-term stability will assist in enhancing formulation robustness.

[Disclaimer: Some data were generated hypothetically for structured presentation.]