Lab Report: Analysis of Various Oil Mixtures

Introduction

This report, identified as Report\_1947, details comprehensive analyses conducted on oil-based mixtures utilizing a range of analytical instruments. The objective was to evaluate the chemical and physical properties, including viscosity, molecular composition, and optical absorbance, of samples formulated from Coconut Oil, Almond Oil, and Jojoba Oil mixed with various additives such as Cetyl Alcohol, Vitamin E, Beeswax, Glycerin, and Gum.

Instruments and Methods

The experiments were conducted using sophisticated laboratory instruments: Gas Chromatograph GC-2010, Mass Spectrometer MS-20, Four Ball FB-1000, Ion Chromatograph IC-2100, UV-Vis Spectrophotometer UV-2600, and Viscometer VS-300. Each instrument was calibrated according to manufacturer standards to ensure data accuracy.

Observations and Measurements

Table 1: Chemical Composition and Molecular Analysis

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| --- | --- | --- | --- | --- | --- | --- |
| **Report ID** | **Instrumentation** | **Base Oil** | **Additive 1** | **Additive 2** | **Measurement** | **Unit** |
| 1947 | Gas Chromatograph GC-2010 | Coconut Oil | Cetyl Alcohol | Vitamin E | 450 | ppm |
| 1947 | Mass Spectrometer MS-20 | Almond Oil | Gum | Vitamin E | 1250 | m/z |
| 1947 | Gas Chromatograph GC-2010 | Jojoba Oil | Gum | Glycerin | 220 | ppm |

In the initial assessments using theGas Chromatograph, the Coconut Oil with Cetyl Alcohol and Vitamin E exhibited a molecular concentration of 450 ppm, indicative of a stable emulsification. The Almond Oil mixture was analyzed by theMass Spectrometershowing significant peaks at 1250 m/z, confirming the presence of Gum and Vitamin E in complex molecular entities.

Table 2: Viscosity Analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Report ID** | **Instrumentation** | **Base Oil** | **Additive 1** | **Measurement** | **Unit** |
| 1947 | Viscometer VS-300 | Almond Oil | Gum | 7691.13 | cP |
| 1947 | Viscometer VS-300 | Coconut Oil | - | 4941.37 | cP |
| 1947 | Viscometer VS-300 | Coconut Oil | Beeswax | 4899.64 | cP |

Viscosity results indicated that Almond Oil with Gum presented a viscosity of 7691.13 cP, significantly higher compared to Coconut Oil mixtures. These high viscosity readings suggest a potential application in formulations requiring thickening properties.

Results and Discussions

The analytical data reveals distinct chemical profiles for each tested mixture. Coconut Oil combined with Cetyl Alcohol and Vitamin E (450 ppm) displays exceptional miscibility due to the surfactant properties of Cetyl Alcohol. A contrasting observation was made with Almond Oil mixtures indicating heavier molecular weights (1250 m/z), which is reflective of complex molecular interactions between the additives.

Interestingly, the application of theUV-Vis Spectrophotometer UV-2600on Coconut Oil mixed with Cetyl Alcohol and Glycerin revealed an absorbance of 1.800 Abs, reinforcing the optimal solubility and compatibility of these ingredients, potentially beneficial for cosmetic applications.

Table 3: Miscellaneous Observations

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| **Comments** |
| The beeswax presence in Coconut Oil samples impacts viscosity minimally, suggesting miscibility. |
| Glycerin as a consistent participating ingredient indicates hydrophilic tendencies in mixtures tested. |

Conclusion

Report\_1947 synthesizes a comprehensive evaluation of oil-based mixtures, highlighting the importance of ingredient compatibility and instrument-specific insights to understand molecular behaviors. The findings suggest potential commercial applications stretching across various industries, notably in personal care formulations. Future studies should explore temperature variabilities on viscosities and projections of scaling these findings to larger production scales.

In unrelated notes: The lab atmosphere maintained ISO standard cleanliness, which contributed to the reliability of the readings. Additionally, team collaboration and cross-validation of test data ensured robust conclusions.