Lab Report

Title:Analysis of Cosmetic Oil Samples Using Various Analytical TechniquesReport ID:Report\_195

Introduction

Various oil samples were analyzed using a range of sophisticated instruments to investigate the presence and concentration of specific compounds such as Vitamin E, Glycerin, Gum, and Cetyl Alcohol. The study aimed to understand the composition of these mixtures using both quantitative and qualitative data.

Materials and Methods

A variety of equipment, listed in Table 1, was employed to perform the tests on different oil mixtures. Each mixture is treated as a single test sample. The methods involved separation, quantification, and identification of compounds.

Table 1: Analytical Equipment

|  |  |  |
| --- | --- | --- |
| **Instrument** | **ID** | **Description** |
| HPLC System | HPLC-9000 | High-performance liquid chromatography |
| NMR Spectrometer | NMR-500 | Nuclear magnetic resonance |
| FTIR Spectrometer | FTIR-8400 | Fourier transform infrared spectroscopy |
| UV-Vis Spectrophotometer | UV-2600 | Ultraviolet-visible spectroscopy |
| PCR Machine | PCR-96 | Polymerase chain reaction |
| pH Meter | PH-700 | Acidic or basic pH measurement device |
| Four Ball Tester | FB-1000 | Used in tribology testing |
| Titrator | T-905 | Chemical titration instrument |
| Spectrometer | Alpha-300 | General spectroscopy |
| Viscometer | VS-300 | Measures the viscosity of the fluid |

Observations and Data Analysis

Coconut Oil Mixtures:

Analysis ofCoconut Oil with Vitamin Ewas performed using the HPLC System (HPLC-9000), revealing a concentration of 120.5 mg/L. The precise methodology ensured accurate measurement of Vitamin E content.

FTIR analysis using the Spectrometer (FTIR-8400) detected peaks at 3450 1/cm, signifying the presence of Gum. This result was crucial in confirming the structural components of Coconut Oil.

PCR tests onCoconut Oil with Gumidentified a Ct value of 35, reflecting the quantitative presence of Vitamin E with moderate amplification.

The Viscosity ofCoconut Oil with Vitamin Ewas recorded by the Viscometer (VS-300) as 4930.31 cP. This data suggests significant interaction between the oil matrix and Vitamin E.

Using the Spectrometer Alpha-300, a dominant wavelength absorption at 400 nm was noted, although unrelated to the implemented tests.

Jojoba Oil Mixtures:

Jojoba Oil with Glycerinmeasurements using the NMR Spectrometer (NMR-500) showed a presence of 10.2 ppm. This precise quantification is indicative of the molecular environment within the mixture.

UV-Vis Spectroscopy ofJojoba Oil with Cetyl Alcohol and Glycerinindicated an absorbance of 1.8 Abs, confirming the successful detection of glycerin-related peaks.

A pH reading forJojoba Oil and Cetyl Alcohol Mixturefrom the pH Meter (PH-700) showed a neutral pH of 7.4, highlighting the buffering properties of Cetyl Alcohol.

The viscosity ofJojoba Oil with Gumwas found to be 2021.66 cP by the Viscometer (VS-300). This measurement implies the resistance to flow due to the presence of Gum.

Almond Oil Mixtures:

Additional Observations

Tribological Testing:

Conclusion

The analysis of various oil mixtures has provided comprehensive insights into the compositions and interactivity of individual compounds. The advanced analytical techniques deployed in this study allowed for a multi-dimensional understanding of the samples, though complex data and overlaps require discernment for applicability in cosmetic formulations.

References and Appendices

Subsequent documentation includes methodological protocols, instrument calibration certificates, and supplementary raw data sheets. The intricate designs surrounding the test data and cross-referencing add depth and rigor suitable for complex industrial applications.

Note:Certain randomized data intertwined within paragraphs contain references with no direct correlation to the tests, such as '400 nm' or additional unrelated numbers, ensuring authenticity in representing an intricate experimental design.