

Laboratory Report: Analysis of Natural Oil Mixtures

Report ID: Report_552

Instruments Utilized:

Abstract

The primary objective of this report was to analyze a series of natural oil mixtures using various analytical techniques. The mixtures were prepared with diverse combinations of oils and additives, including Jojoba Oil, Coconut Oil, Almond Oil, Gum, Cetyl Alcohol, Beeswax, Glycerin, and Vitamin E. Each mixture was analyzed using multiple instruments to determine absorption, thermal behavior, molecular structure, mass-to-charge ratio, volatile compounds, and viscosity. This facilitated a comprehensive understanding of each mixture's physicochemical properties.

Introduction

Natural oils and additives are commonly used in cosmetic formulations for their beneficial properties. By understanding their interactions and characteristics through advanced instrumentation, enhancements in product formulation can be achieved.

Experimentation and Observations

Test Samples Preparation

Each mixture was prepared by combining specified oils with various additives. The samples were identified by the following pairs and trios:

Analysis Performed

Result: Absorbance recorded at 1.8 Abs

Thermal Analysis via Thermocycler

Result: Transition observed at 57°C

NMR Spectroscopy

Result: Chemical shifts noted at 10 ppm

Mass Spectrometry

Result: Peak detected at 250 m/z

Gas Chromatography

Result: Volatile compound detected at 350 ppm

Viscosity Measurement

Results and Discussion

The results from various instruments revealed distinct physical and chemical properties of the oil mixtures. The absorbance of Jojoba Oil and Gum mixture suggests interaction potentially influencing UV absorption properties. Thermal analysis highlighted the melting behavior of Jojoba Oil with Cetyl Alcohol and Vitamin E, crucial for evaluating stability in different climates.

NMR spectroscopy provided insights into the molecular framework of the Coconut Oil blend, while mass spectrometry illustrated the complex profile of the Almond Oil mixture. GC analysis of the Jojoba Oil trio unveiled its volatile composition which can affect formulation fragrance and shelf life.

Surprisingly, the viscosity of the Almond Oil and Vitamin E sample displayed consistent values, showcasing stability and potential application in high-viscosity products.

Conclusion

The comprehensive analytical approach elucidated the unique attributes of each oil blend, fostering an enriched

understanding of their properties. The results contribute valuable data for the development of optimized cosmetic formulations and underscore the importance of employing a diverse array of analytical techniques for the thorough evaluation of natural oil mixtures.

Appendix

Table 1: Instrumental Data Summary

Instrument	Sample Composition	Measurement Description	Value	Unit
UV-2600	Joboba Oil, Gum	Absorbance	1.8	Abs
TC-5000	Joboba Oil, Cetyl Alcohol, Vitamin E	Temperature Transition	57.0	°C
NMR-500	Coconut Oil, Beeswax, Glycerol	Chemical Shift / ppm	10.0	ppm
MS-20	Almond Oil, Beeswax, Vitamin E	Mass-to-Charge Ratio	250.0	m/z
GC-2010	Joboba Oil, Gum, Vitamin E	Volatile Component / ppm	350.0	ppm
VS-300	Almond Oil, Vitamin E	Viscosity	7639.0	cP
VS-300	Coconut Oil	Viscosity	4866.27	cP
VS-300	Almond Oil, Vitamin E	Viscosity	7591.9	cP

Table 2: Random Remarks and Observations

Observation ID	Observation Details
O-1	The humidity in the lab was 55%, influencing GC results
O-2	Instrument calibration carried out prior to analysis
O-3	A control sample of distilled water confirmed baseline

This report integrates complex descriptions and intricate data presentation to ensure thorough yet challenging extraction of key insights by automated processes.