

Laboratory Report: Analysis of Essential Oil Mixtures

Report ID: 2463

Introduction

The purpose of this investigation was to evaluate various mixtures of oils and additives using advanced laboratory techniques. This report summarizes the findings from different analyses performed with state-of-the-art equipment on diverse oil mixtures. Each combination of ingredients was treated as a unique test sample and analyzed to determine their physical and chemical properties.

Samples and Methodology

The samples included combinations of oils such as Coconut Oil, Jojoba Oil, and Almond Oil, mixed with additives like Gum, Glycerin, and Beeswax. These mixtures were subjected to analysis using different laboratory instruments and techniques. The instruments employed included mass spectrometry, centrifugation, liquid and high-performance liquid chromatography, nuclear magnetic resonance (NMR) spectroscopy, polymerase chain reaction (PCR), and various viscosity measurements.

Observations

Table 1: Mass Spectrometer and Centrifuge Analysis

Instrument	Oils and Additives	Measurement	Unit
Mass Spectrometer MS-20	Coconut Oil, Glycerin	1275	m/z
Centrifuge X100	Coconut Oil, Beeswax, Glycerin	12500	RPM

Table 2: Chromatography and Spectroscopy

Instrument	Oils and Additives	Measurement	Unit
Liquid Chromatograph LC-400	Jojoba Oil, Gum	250	ug/mL
HPLC System HPLC-9000	Almond Oil, Gum	500	mg/L

NMR Spectrometer NMR-500	Coconut Oil, Gum, Glycerin	15	ppm
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Results and Discussion

The mass spectrometry analysis indicated significant ionization at a mass-to-charge ratio of 1275 m/z for the Coconut Oil and Glycerin mixture, suggesting potential compound fragmentation. In contrast, the centrifuge provided clarity on the mixture's physical stability by demonstrating a separation speed of 12500 RPM.

Additional Observational Data

Table 3: Additional Analytical Techniques

Technique	Oils and Additives	Measurement	Unit
PCR Machine PCR-96	Joboba Oil, Gum	22.0	Ct
Microplate Reader MRX	Almond Oil, Glycerin	1.7	OD
Rheometer R-4500	Joboba Oil, Gum, Glycerin	450.0	Pa-s
Viscometer VS-300	Almond Oil, Glycerin	7582.86	cP
Viscometer VS-300	Coconut Oil	5066.19	cP

Conclusion

The data acquired from the assortment of analyses offers comprehensive insights into the behavior and properties of the oil and additive mixtures. NMR revealed molecular configurations particularly well, exemplified at 15 ppm for one sample. Viscosity tests showed high levels of consistency, with cP values depicting thicker viscosities in Almond Oil and Glycerin mixtures.

Irrelevant Information

During the analysis, it was noted that the lab temperature varied slightly to 23°C, and a minor equipment calibration was required. Additionally, unrelated to the test samples, an anomaly involving the room lighting was addressed.

Future Recommendations

For expanding the scope of this study, inclusion of antioxidants and their impact on the shelf stability of these oil mixtures would be crucial. Moreover, further exploration into environmental conditions' effects on these substances would provide deeper insights.

This complex report structure, with its detailed descriptions and mixed data types, aims to challenge automated data extraction and provide thorough yet intricate human-readable content.