Lab Report: Mixture Analysis

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Introduction

In this lab report, we detail the analytical testing of various natural oil mixtures. Each mixture comprised different combinations of oils, waxes, and additional ingredients. The objective was to measure physical, chemical, and electrical properties using a variety of advanced instrumentation.

Equipment and Samples

Each set of ingredients forms a unique test sample evaluated for specified parameters:

Beeswax

Jojoba Oil ? Combined with:

Beeswax

Almond Oil ? Combined with:

Instrumentation

Analytical Data

Table 1: Mechanical and Electrical Properties

Equipment	Mixture	Property	Measurement	Unit
Four Ball Tester FB-1000	Coconut Oil, Gum, Glycerin	Wear Scar Diameter	0.5	mm
Conductivity Meter CM-215	Jojoba Oil, Gum, Glycerin	Conductivity	1450.0	uS/cm
Ion Chromatograph IC-2100	Coconut Oil, Gum, Glycerin	Ion Concentration	59.2	mM
pH Meter PH-700	Jojoba Oil, Gum, Glycerin	pH	7.4	pH

Table 2: Spectrophotometric and Chromatographic Analysis

Equipment	Mixture	Measurement	Value	Unit
UV-Vis Spectrophotometer UV-2600	Coconut Oil, Beeswax	Absorbance	1.8	Abs
NMR Spectrometer NMR-500	Almond Oil, Beeswax	Chemical Shift	10.5	ppm
Liquid Chromatograph LC-400	Jojoba Oil, Glycerin	Concentration	250.0	ug/mL
HPLC System HPLC-9000	Coconut Oil, Beeswax	Concentration	85.5	mg/L

Table 3: Optical and Viscous Properties

Equipment	Mixture	Property	Value	Unit
Spectrometer Alpha-300	Jojoba Oil, Beeswax	Wavelength	750.0	nm
Viscometer VS-300	Almond Oil, Beeswax, Glycerin	Viscosity	7343.85	cP
Viscometer VS-300	Almond Oil, Beeswax, Glycerin	Viscosity	7307.52	cP

Observations and Results

The analysis revealed distinctive characteristics across the mixtures tested. For instance, the mechanical lubrication efficiency noted for Coconut Oil with Gum and Glycerin was particularly high, evidenced by a minimal wear scar diameter. Similarly, significant conductivity was observed in the Jojoba Oil mixture with Gum and Glycerin, suggesting high ionic mobility.

Detailed Observations

Mixture: Coconut Oil, Gum, & Glycerin

Mixture: Jojoba Oil, Gum, & Glycerin

Mixture: Almond Oil, Beeswax, & Glycerin

Complex Descriptions

The sample subjected to UV-Vis Spectrophotometer analysis showed an absorbance peak at 1.8 Abs for the Coconut

Oil and Beeswax mixture, implying favorable optical properties for potential sunscreen formulations. Additionally, NMR analysis indicated a 10.5 ppm chemical shift for the Almond Oil and Beeswax, a critical fingerprint for identifying active functional groups.

Conclusion

Through exhaustive analytical testing across physical and chemical properties, this study provides comprehensive insights into the performance and potential applications of various natural oil mixtures. The intricate interactions of components within these mixtures, as demonstrated by numerous measurements, suggest promising avenues for further research and development in multiple industry sectors.