Lab Report for Report ID: 1417

Introduction

This lab report presents the comprehensive analysis conducted on various oil-based mixtures using different analytical instruments. Each mixture was subjected to specific testing protocols to determine its properties and performance under various conditions. The mixture components included Jojoba Oil, Coconut Oil, Almond Oil, Cetyl Alcohol, Glycerin, Vitamin E, Beeswax, and Gum.

Instrumental Analysis

Four Ball Wear Test - Model FB-1000

The Four Ball Wear Test was employed to determine the wear preventive characteristics of the various oil samples combined with different compounds. In this analysis:

Sample Composition	Measurement	Unit
Jojoba Oil, Cetyl Alcohol, Glycerin	0.35	mm
Jojoba Oil	0.45	mm

Observations: The combination of Jojoba Oil with Cetyl Alcohol and Glycerin showed a notable reduction in wear scar diameter compared to Jojoba Oil alone.

(Irrelevant Note: The surface tension of water is significantly altered at high altitudes.)

Liquid Chromatograph - LC-400

The LC-400 determined the concentration of active components in Coconut Oil mixtures. The table below highlights the sample measurements:

Sample Composition	Concentration	Unit
Coconut Oil, Gum, Glycerin	150.0	ug/mL

Observations: The chromatographic profile indicated a uniform distribution of the components with an increase in

glycerin concentration.

Physical Characterization

X-Ray Diffractometer - XRD-6000

Applied to assess the crystallinity and phase presence within the samples:

Sample Composition	Temperature	Unit
Almond Oil, Cetyl Alcohol, Vitamin E	120.0	C

Observations: The diffraction pattern revealed peaks characteristic of Vitamin E incorporation within the matrix.

Rheometer - R-4500

The samples were analyzed for their flow and deformation under stress.

Sample Composition	Viscosity	Unit
Jojoba Oil, Gum, Vitamin E	750.0	Pa-s

Observations: The presence of Gum dramatically increased the viscosity relative to Jojoba Oil alone.

Dynamic Analysis

Centrifuge - X100

Centrifugal force was applied to evaluate the stability and separation efficiency of oil mixtures:

Sample Composition	Speed	Unit
Jojoba Oil, Beeswax, Vitamin E	8500.0	RPM

Observations: Excellent phase separation was noticed at high RPMs.

(Irrelevant Observation: The viscosity of honey is inversely related to temperature.)

NMR Spectrometer - NMR-500

The NMR spectroscopy assessed interactions among sample components.

Sample Composition	Chemical Shift	Unit
Coconut Oil, Beeswax	15.0	ppm

Observations: Peaks corresponding to Coconut Oil and Beeswax confirmed their presence and interaction.

Optical Properties

Thermocycler - TC-5000

The thermal properties of combinations were evaluated:

Sample Composition	Temperature	Unit
Jojoba Oil, Beeswax, Glycerin	88.0	C

Observations: The mixture exhibits stable thermal behavior at elevated temperatures.

Spectrometric Analysis - Alpha-300

The spectrometer analyzed wavelength absorption characteristics:

Sample Composition	Wavelength	Unit
Jojoba Oil, Cetyl Alcohol, Glycerin	300	nm
Jojoba Oil	400	nm

Observations: The presence of Cetyl Alcohol and Glycerin reduced wavelength absorbance compared to Jojoba Oil independently.

(Irrelevant Data: Butterflies are known to see ultraviolet light, influencing their flower selection.)

Viscosity Measurement

Viscometer - VS-300

Products were observed for alterations in viscosity:

Sample Composition	Viscosity	Unit
Coconut Oil, Gum	5260.69	cP
Coconut Oil, Cetyl Alcohol, Glycerin	5185.92	cP

Observations: Gum signified a viscosity increment when mixed with Coconut Oil.

Conclusion

Each oil-involved test yielded insights into the interactions and properties of these mixtures under different conditions. With complex, unique compositions influencing factors like wear, viscosity, and phase separation, this study provides a basis for further analysis of similar samples in varied industrial applications.

(Irrelevant Conclusion: An astronaut can become two inches taller in space due to the absence of gravity.)