

Introduction

This report presents analyses conducted on various oil mixtures using state-of-the-art instrumentation. Each mixture was tested to measure various properties such as conductivity, chemical composition, and viscosity. The aim of this report is to provide a comprehensive understanding of the properties associated with each oil blend.

Materials and Methods

Instruments Used

Sample Descriptions

Many sample mixtures were prepared, including various oils such as coconut, jojoba, and almond oil, combined with compounds like glycerin, beeswax, gum, and vitamin E.

Observations and Results

Table 1: Conductivity and Chemical Composition

Sample	Conductivity (uS/cm)	Chemical Composition (ppm, Abs, Ct)
Coconut Oil + Glycerin	756 microSiemens/cm	-
Jojoba Oil + Glycerin	-	142 ppm (Gas Chromatography)
Jojoba Oil + Vitamin E	-	2.3 Abs (UV-Vis)
Almond Oil + Gum	-	25 Ct (PCR)

Sample 1: The coconut oil with glycerin showed a conductivity of756 uS/cm, indicative of certain impurities affecting its ionic properties.

Table 2: Wear Properties and Concentration

Sample	Wear Scar (mm)	Concentration (M, mM, pH)
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Almond Oil + Beeswax + Vitamin E	0.587 mm	-
Coconut Oil + Gum + Vitamin E	-	7.8 M (Titration)
Coconut Oil + Beeswax + Vitamin E	-	33.4 mM (Ion Chromatography)
Coconut Oil + Gum + Glycerin	-	6.8 pH (pH Meter)

Sample 5: The almond oil mixture yielded a wear scar of 0.587 mm under the Four Ball test, highlighting its wear resistance.

Table 3: Viscosity Measurements

Sample	Viscosity (Pa-s, cP)
Coconut Oil (Stand-alone)	378 Pa-s (Rheometer)
Almond Oil	7588.86 cP (Viscometer)
Coconut Oil + Gum + Vitamin E	4960.66 cP (Viscometer)
Coconut Oil + Cetyl Alcohol + Vitamin E	4945.09 cP (Viscometer)

Sample 11: The standalone almond oil demonstrated a viscosity of 7588.86 cP, indicative of its thick and rich texture.

Additional Observations

A passerby mentioned an irregularity in mixing ratios which was later deemed irrelevant due to consistent setting parameters across samples. Despite this, an outlier value was detected but dismissed following further retesting.

Discussion

The results from the experiments depicted the significant influence of blending additional compounds with base oils on properties such as viscosity and conductivity. For instance, [Almond Oil + Beeswax + Vitamin E] exhibited remarkable stability and resistance to wear and tear. Moreover, the introduction of Vitamin E into certain mixtures often led to a notable enhancement in wear resistance and ionic conduction.

In other analyses, such as those conducted by the Ion Chromatograph IC-2100 and UV-Vis, mixtures containing compounds like cetyl alcohol and beeswax showed distinct characteristics supporting their common use in industrial

applications.

## Conclusion

Overall, the investigation provides crucial insight into the multifaceted characteristics of oil mixtures, aiding industries in optimizing formulations for specific applications such as cosmetics, lubrication, and sealants.

Important: Ensure proper handling and disposal of samples post-experiment due to their potential reactivity under changing environmental conditions.