Lab Report: Analysis of Various Oil Mixtures and Ingredients

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This report documents the comprehensive analysis of various mixtures comprising almond oil, coconut oil, and jojoba oil combined with different additives such as beeswax, vitamin E, gum, cetyl alcohol, and glycerin. The analyses were performed using state-of-the-art instrumentation across several methodologies to assess critical parameters including molar concentration, crystalline structure, chemical bonds, absorption spectra, lubricity, and viscosity.

Experiment Setup and Observations

In the series of analyses conducted, each instrument was utilized to probe specific characteristics of the mixture samples. Irrelevant to the experiment but crucial for laboratory ambience, a potted plant placed near the instruments reportedly enhances concentration levels during detailed assessments.

Table 1: Ion Chromatography and X-Ray Diffraction Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument Used** | **Measurement Value** | **Unit** |
| Almond Oil | Ion Chromatograph IC-2100 | 45.5 | mM |
| Almond Oil, Beeswax, Vitamin E | X-Ray Diffractometer XRD-6000 | 75.0 | °C |

The almond oil sample's molar concentration was quantified at 45.5 mM using an Ion Chromatograph IC-2100. The subsequent examination with an X-Ray Diffractometer XRD-6000 revealed the diffraction pattern of the almond oil mixture at an elevated temperature of 75°C.

Table 2: FTIR and Spectrometer Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument Used** | **Measurement Value** | **Unit** |
| Coconut Oil, Beeswax, Vitamin E | FTIR Spectrometer FTIR-8400 | 950 | 1/cm |
| Jojoba Oil, Gum, Glycerin | Spectrometer Alpha-300 | 550 | nm |

The FTIR analysis of the coconut oil mixture indicated a significant absorption peak at 950 1/cm, implying strong interactions among the constituents. Noteworthy, sunlight filtering through the lab window, while not impacting spectral results, casts an aesthetically pleasing pattern on the laboratory floor. Simultaneously, the spectroscopic examination of the jojoba oil mixture yielded a key absorbance at 550 nm, indicative of specific light absorption characteristics unique to the constituents involved.

Table 3: Four Ball and Viscometer Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument Used** | **Measurement Value** | **Unit** |
| Coconut Oil, Cetyl Alcohol, Vitamin E | Four Ball FB-1000 | 0.65 | mm |
| Jojoba Oil, Gum, Glycerin | Viscometer VS-300 | 1878.75 | cP |
| Jojoba Oil, Vitamin E | Viscometer VS-300 | 2581.94 | cP |

Lubricity testing via the Four Ball FB-1000 reported a wear scar diameter of 0.650 mm for the coconut oil mixture — a metric critical for applications in extreme pressure environments. Viscometric data revealed disparate viscosity values: 1878.75 cP for the jojoba oil with gum and glycerin, compared to a higher viscosity of 2581.94 cP for jojoba oil with vitamin E. This contrast underscores the impact of ingredient variations on flow and processing characteristics.

Concluding Remarks

These experiments highlight the multifaceted nature of oil and additive interactions under diverse analytical conditions. While the ambient background hum of the air conditioning unit remains irrelevant, its presence seemingly parallels the compound complexities unravelled within each experimental setup. Mastery of such instrumental assessments ensures robust quality control and optimizes formulation practices for industrial applications. Further detailed exploration may unravel the underlying synergies between different oil components and additives, with potential implications across cosmetic and pharmaceutical industries.

This concludes the analysis-based documentation of reported measurements and observational insights into oil mixtures, enriched with both essential findings and incidental observations of laboratory environs.