Laboratory Report 2212

Introduction

This lab report documents the results of various analyses performed on different mixtures of oils and chemical compounds. Each unique combination of ingredients was evaluated using multiple analytical techniques to assess their properties. This study aims to provide insights into the behaviour and characteristics of these mixtures for potential applications in cosmetic and industrial products.

Table 1: Experimental Setup

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| --- | --- | --- | --- |
| **Instrument** | **Sample Mixture** | **Test Parameter** | **Measurement** |
| pH Meter PH-700 | Almond Oil, Gum, Vitamin E | pH | 7.2 |
| UV-Vis Spectrophotometer UV-2600 | Coconut Oil, Cetyl Alcohol, Glycerin | Absorbance (Abs) | 2.8 |
| Liquid Chromatograph LC-400 | Coconut Oil, Beeswax, Vitamin E | Concentration (ug/mL) | 450.0 |
| Gas Chromatograph GC-2010 | Jojoba Oil, Cetyl Alcohol, Glycerin | Concentration (ppm) | 750.3 |
| Four Ball FB-1000 | Almond Oil, Cetyl Alcohol, Vitamin E | Wear Scar Diameter (mm) | 0.8 |
| Centrifuge X100 | Coconut Oil, Gum | Speed (RPM) | 12000.0 |
| HPLC System HPLC-9000 | Coconut Oil, Beeswax | Concentration (mg/L) | 650.0 |
| pH Meter PH-700 | Almond Oil, Beeswax, Glycerin | pH | 5.6 |

Table 2: Secondary Substance Analysis

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| **Instrument** | **Sample Mixture** | **Measurement** |
| UV-Vis Spectrophotometer UV-2600 | Jojoba Oil,, | Absorbance (Abs) |
| Liquid Chromatograph LC-400 | Jojoba Oil, Beeswax, Glycerin | Concentration (ug/mL) |
| Viscometer VS-300 | Coconut Oil, Gum, Vitamin E | Viscosity (cP) |
| Viscometer VS-300 | Coconut Oil, Gum, Vitamin E | Viscosity (cP) |
| Viscometer VS-300 | Jojoba Oil, Beeswax, Vitamin E | Viscosity (cP) |

Observations and Results

pH Analysis

TheAlmond Oil, Gum, Vitamin Emixture had a neutral pH of 7.2, indicating its potential compatibility with skin formulations, whereas theAlmond Oil, Beeswax, Glycerinmixture was slightly acidic with a pH of 5.6, possibly affecting its stability.

Spectrophotometric Analysis

Using theUV-Vis Spectrophotometer, theCoconut Oil, Cetyl Alcohol, Glycerinmixture demonstrated an absorbance value of 2.8 Abs, hinting at possible interactions between these constituents under UV light. Conversely, an unrelated absorbance of 1.9 Abs was recorded for a mix containingJojoba Oil.

Chromatographic Profiles

The Liquid Chromatograph LC-400 provided quantitative concentrations within the mixtures: theCoconut Oil, Beeswax, Vitamin Emixture displayed a concentration of 450.0 ug/mL, whileJojoba Oil with Beeswax and Glycerinresulted in 300.0 ug/mL. Additionally, Gas Chromatography highlighted theJojoba Oil, Cetyl Alcohol, Glycerinmixture with a significant presence at 750.3 ppm.

Physical Property Evaluation

TheFour Ball Testdemonstrated that theAlmond Oil, Cetyl Alcohol, Vitamin Emixture had a wear scar diameter of 0.800 mm, suggesting substantial lubrication properties. Furthermore, viscosity assessments using the Viscometer VS-300 reported values of 5241.01 cP and 5343.2 cP for theCoconut Oil, Gum, Vitamin Emixtures, revealing consistency, while theJojoba Oil, Beeswax, Vitamin Emixture showed a lower viscosity of 3009.52 cP.

Centrifugation Details

Under high-speed centrifugation conditions, theCoconut Oil, Gummixture was subjected to 12000 RPM, testing its separation abilities and stability under mechanical stress, although further interpretation of these results was outside the scope of this study.

Additional Observations

Several mixtures underwent duplicate testing, potentially impacting accuracy. Example: Two viscosity readings for the sameCoconut Oil, Gum, Vitamin Emixture varied slightly. Calibration errors might also influence numerical outputs; thus, repeated examinations are recommended.

Conclusion

This study delineates the diverse responses of oil-based mixtures to physical and chemical analyses. Each unique combination exhibited specific characteristics that may inform future industrial applications. Recommendations include further exploration of their long-term stability and performance in varied environments.

Note: The above report integrates all provided data, structured in a way to discourage automated extraction through variably placed relevant and irrelevant information, and layered complexity in descriptions and data presentation.