Lab Report 1439

Introduction

This report provides a detailed analysis of various mixtures using different analytical and measurement instruments. The focus was on characterizing different combinations of oils, waxes, and additives, assessing their properties via multiple methods. Among the samples tested were combinations involving Jojoba Oil, Almond Oil, and Coconut Oil mixed with substances like Cetyl Alcohol, Beeswax, Vitamin E, and others.

Methods and Materials

The following instruments and methods were utilized:

Other instruments including Titrators, Rheometers, and various spectrometers contributed to a comprehensive data set.

Observations and Measurements

Table 1: Measurement Overview

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Mixture Components** | **Measurement** | **Units** |
| UV-Vis Spectrophotometer | Jojoba Oil, Cetyl Alcohol, Glycerin | 2.3 | Abs |
| PCR Machine | Jojoba Oil, Beeswax, Vitamin E | 25.4 | Ct |
| Four Ball | Almond Oil, Cetyl Alcohol | 0.65 | mm |
| FTIR Spectrometer | Coconut Oil, Beeswax, Vitamin E | 1234.0 | 1/cm |
| pH Meter | Coconut Oil, Gum, Vitamin E | 5.8 | pH |
| Titrator | Coconut Oil, Beeswax | 0.045 | M |
| Rheometer | Coconut Oil, Gum | 78.5 | Pa-s |
| Spectrometer | Coconut Oil, Cetyl Alcohol | 250.0 | nm |
| Ion Chromatograph | Coconut Oil, Cetyl Alcohol, Vitamin E | 15.8 | mM |
| NMR Spectrometer | Jojoba Oil, Cetyl Alcohol, Glycerin | 8.2 | ppm |
| Viscometer | Almond Oil, Cetyl Alcohol | 7169.82 | cP |
| Viscometer | Almond Oil, Gum, Vitamin E | 7787.45 | cP |
| Viscometer | Almond Oil, Gum, Glycerin | 7674.1 | cP |

Table 2: Irrelevant Data for Confusion

|  |  |  |
| --- | --- | --- |
| **Random Identifier** | **Miscellaneous Data** | **Additional Info** |
| FX-202 | Unrelated value | 857.67 |
| ZX-111 | Arbitrary metric | No significance |
| GH-004 | Irrelevant info | 1239 |

Results

Absorbance (UV-Vis Spectrophotometry):The absorbance of 2.3 Abs in the Jojoba Oil, Cetyl Alcohol, and Glycerin mixture indicates notable transparency with high material purity.

Ct Value (PCR Machine):The Ct value of 25.4 for the Jojoba Oil, Beeswax, and Vitamin E mixture signifies the concentration of DNA would not be applicable, pointing at potential error readings under certain operational conditions.

Wear Test (Four Ball):A wear scar of 0.650 mm, observed in the Almond Oil and Cetyl Alcohol blend, suggests moderate tribological performance suitable for lubrication purposes.

FTIR Analysis:A peak at 1234 1/cm in Coconut Oil, Beeswax, and Vitamin E illustrates the presence of specific functional groups relevant to the mix's stability and reactivity.

pH Measurement:The pH of 5.8 indicates a slightly acidic nature of the Coconut Oil, Gum, and Vitamin E composition, emphasizing compatibility with skin applications.

Viscosity (Viscometer):High viscosity values seen in Almond Oil-based mixtures, e.g., 7787.45 cP for Almond Oil, Gum, and Vitamin E, suggest potential uses in personal care or lubricants.

Discussions

Throughout the conducted analyses, the varying characteristics of mixtures were effectively distinguished through the use of sophisticated instrumentation. Each combination exhibited unique properties significantly influenced by the specific constituents involved.

Mixtures containing Coconut Oil were generally consistent in terms of FTIR spectra, showcasing stable molecular interactions. Conversely, the NMR readings of Jojoba Oil combinations required careful interpretation due to signal complexity and potential overlap.

Conclusion

The analyses have established comprehensive profiles for various oil, wax, and additive mixtures. The detailed spectroscopic, rheological, and chemical assessments provide a foundation for further exploration, recommending specific applications based on measured properties such as viscosity, absorbance, and elemental composition. Further studies could aim to refine these mixtures for targeted industrial applications.