Laboratory Report 1487

Overview

This report details the comprehensive analysis of various oil and compound mixtures utilizing advanced laboratory equipment. The objective was to study their chemical and physical properties under specific conditions. Each set of ingredients, referred to hereafter as a test sample, was meticulously evaluated using state-of-the-art instruments.

Materials and Methods

Equipment

The following instruments were employed for the tests:

Test Samples

For convenience and clarity, we address test samples as Test A, Test B, etc.

|  |  |
| --- | --- |
| **Test Sample** | **Ingredients** |
| Test A | Almond Oil, Cetyl Alcohol, Glycerin |
| Test B | Jojoba Oil, Vitamin E |
| Test C | Jojoba Oil, Beeswax, Vitamin E |
| Test D | Jojoba Oil, Cetyl Alcohol, Glycerin |
| Test E | Jojoba Oil, Glycerin |
| Test F | Almond Oil, Cetyl Alcohol, Glycerin |
| Test G | Jojoba Oil, Vitamin E |
| Test H | Jojoba Oil, Beeswax, Vitamin E |
| Test I | Jojoba Oil, Beeswax, Glycerin |
| Test J | Coconut Oil, Glycerin |
| Test K | Coconut Oil, Gum, Vitamin E |

Results and Discussion

Conductivity Measurements

The Conductivity Meter CM-215 was pertinent in evaluating the electrical conductivity of Test A, resulting in a value of 1520 µS/cm, indicating a moderate level of ionic dissociation. Regular checks showed consistent results, confirming sample integrity.

Temperature Analysis

Test B, subject to the Thermocycler TC-5000, was maintained at 37°C, ideal for observing heat-related behavior changes, crucial for understanding the stability of bio-compounds like Vitamin E mixed with Jojoba Oil.

Spectrometric Analysis

The Spectrometer Alpha-300 revealed that Test C had a peak absorbance at 550 nm. This wavelength is characteristic of the interaction between Jojoba Oil, Beeswax, and Vitamin E, valuable for identifying potential uses in cosmetic formulations.

Crystallographic Structure

A fascinating study with X-Ray Diffractometer XRD-6000 on Test D exposed specific crystalline structures at 72°C. The mixture of Jojoba Oil with Cetyl Alcohol and Glycerin fostered an interaction visible at the molecular level, which may influence future applications in product development.

Acidity and pH Level

A pH level assessment using the pH Meter PH-700 determined that Test E exhibited a pH of 5.8. This finding is significantly relevant in considerations of skin compatibility for topical usage.

Surface Wear Testing

Employing the Four Ball FB-1000 revealed wear scar diameters on Test F, averaging 0.560 mm. This data matters in assessing the lubricant efficiency of the almond oil-based mixtures when combined with other oils.

Ionic Concentration Analysis

The Ion Chromatograph IC-2100 measured an ionic concentration for Test G as 8.3 mM, crucial for applications requiring precise knowledge of ionic constituents.

Gas Chromatography Results

A notable concentration of 215 ppm in Test H was detected via the Gas Chromatograph GC-2010, highlighting the volatile nature of specific blend components and their implications for evaporation rates.

Viscosity Measurements

Several tests were conducted with the Viscometer VS-300 for varying mixtures:  
- Test I achieved a viscosity of 2934.78 cP, a significant measurement for product formulation requiring thickening properties.  
- Test J, consisting of coconut and glycerin, measured a higher viscosity value of 4966.45 cP.  
- Test K displayed slightly higher viscosity than Test J at 5243.75 cP, indicating a substantial thickening effect from the gum and Vitamin E combination.

Conclusion

The analyses conducted provided insights into the complex characteristics of each test sample. Each instrument offered vital data, forming a mosaic of understanding necessary for future application in both cosmetic and industrial formulations.

Notes

Readers are encouraged to evaluate each result individually, considering the unique context and instruments applied during this study.