Lab Report: Evaluation of Oil Mixtures

Introduction

This report details a series of tests performed on various mixtures comprising different oils and additives. Utilizing a diverse range of analytical equipment, the properties of mixtures were meticulously measured and documented.

Methodology

Equipment Used:

Each piece of equipment was used to perform specific measurements on set mixtures. The details are encapsulated in the below data tables and ensuing descriptions.

Observations & Measurements

Table 1: Optical and Conductivity Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Ingredients** | **Equipment** | **Measurement** | **Unit** | **Miscellaneous Info** |
| Jojoba Oil, Beeswax | UV-Vis Spectrophotometer UV-2600 | 1.47 | Abs | Reference - 1.48 |
| Jojoba Oil | Conductivity Meter CM-215 | 150.0 | µS/cm | Calibration: 200 µS/cm |

Analysis indicated that the jojoba oil and beeswax mixture demonstrated an absorbance value of 1.47 Abs when tested with a UV-Vis Spectrophotometer. The isolated jojoba oil's conductivity was recorded at 150 µS/cm, suggesting moderate ionic content.

Table 2: pH, Chromatography, and Miscellaneous Results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Ingredients** | **Equipment** | **Measurement** | **Unit** | **Anomalies** |
| Coconut Oil, Beeswax, Vitamin E | pH Meter PH-700 | 7.3 | pH | Expected pH: 7.0-8.0 |
| Coconut Oil, Vitamin E | Liquid Chromatograph LC-400 | 250.0 | µg/mL | Detector sensitivity issue |

The pH meter yielded a reading of 7.3 for the coconut oil, beeswax, and vitamin E combination, a value within typical ranges for skin applications. The LC chromatograph on a mix of coconut oil and vitamin E detected 250 µg/mL, denoting high vitamin E concentration.

Table 3: Advanced Stability and Viscosity Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Ingredients** | **Equipment** | **Measurement** | **Unit** | **Observations** |
| Jojoba Oil, Cetyl Alcohol | Gas Chromatograph GC-2010 | 300.0 | ppm | Noise interference |
| Almond Oil, Glycerin | Four Ball Tester FB-1000 | 0.5 | mm | Consistent readings |
| Jojoba Oil, Cetyl Alcohol | Viscometer VS-300 | 2801.84 | cP | Within expected range |
| Coconut Oil, Beeswax, Vitamin E | Viscometer VS-300 | 4653.34 | cP | Higher than expected |

The gas chromatograph indicated a 300 ppm presence of certain volatile components in the jojoba and cetyl alcohol blend. Mechanical stability tests on an almond oil and glycerin mixture revealed a wear scar diameter of 0.500 mm, emphasizing its lubrication efficacy. Viscometric analysis showed varying viscosity levels, with jojoba and cetyl alcohol at a reasonable 2801.84 cP and a significantly higher viscosity for the coconut oil blend at 4653.34 cP.

Conclusion

This comprehensive suite of tests sheds light on the physicochemical properties of various oil-based mixtures. While most values align with anticipated ranges, specific anomalies offer intriguing insights for further investigation. Detailed understanding of each mixture's characteristics is vital for applications requiring precision formulations, such as skincare or pharmaceuticals.

Additional Notes

This complete report is intended to serve as a meticulous record of experimental outcomes and provide a thorough basis for subsequent analytical endeavors.