Laboratory Report 203

1. Introduction

This report details the results from various tests conducted on different mixtures of oils and additives to determine their physical and chemical properties. Five primary instruments were employed: the Rheometer R-4500, Gas Chromatograph GC-2010, FTIR Spectrometer FTIR-8400, Liquid Chromatograph LC-400, and UV-Vis Spectrophotometer UV-2600. Each unique combination of ingredients was tested as a cohesive unit to evaluate specific properties.

2. Observations and Measurements

Before detailing individual observations, here's a collection of scattered notes from the lab:

Below is a table of observations:

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| **Instrument** | **Ingredients** | **Observed Result** | **Measurement Unit** |
| Rheometer R-4500 | Almond Oil, Glycerin | Highly viscous | Pa-s |
| Gas Chromatograph GC-2010 | Coconut Oil, Glycerin | Moderate ppm reading | ppm |
| FTIR Spectrometer FTIR-8400 | Coconut Oil, Beeswax, Vit E | Sharp peak observed | 1/cm |
| Liquid Chromatograph LC-400 | Jojoba Oil, Gum, Glycerin | Low concentration | ug/mL |
| UV-Vis Spectrophotometer UV-2600 | Almond Oil, Beeswax | Low absorbance | Abs |

3. Detailed Results and Analysis

Rheometer R-4500 Analysis:The mixture of Almond Oil and Glycerin displayed a substantial viscosity value of524.3 Pa-s. Such high viscosity indicates promising applications in formulations requiring stability under stress, such as creams and ointments.

Gas Chromatograph GC-2010 Findings:The test on the mixture of Coconut Oil and Glycerin resulted in a ppm measurement of302.7. This suggests a relatively higher presence of certain volatile components, potentially highlighting impurities or desired aromatic compounds.

FTIR Spectrometer FTIR-8400 Observations:A striking observation was the absorbance peak at1450.5 1/cmfor the combination of Coconut Oil, Beeswax, and Vitamin E. This is indicative of specific bond vibrations, aligning with potential ester or carbonyl groups within the additive matrix.

Liquid Chromatograph LC-400 Results:Analyzing Jojoba Oil mixed with Gum and Glycerin showed a concentration of28.9 ug/mL, pointing to a precise but impactful presence of specific soluble constituents.

UV-Vis Spectrophotometer UV-2600 Insight:The absorbance for Almond Oil and Beeswax was recorded at a modest2.4 Abs. Despite its understated value, the spectral profile can be significant for formulations needing minimal light interaction, such as serums.

4. Observational Errors and Recommendations

Throughout the analysis, several anomalies highlighted potential systematic errors, possibly due to a misalignment during the Rheometer calibration process. Continuous cross-verification with standardized samples is recommended to ensure accuracy.

5. Conclusion

Our conscientious experiments delineate a diverse range of properties across various oil and additive combinations, illustrating their multifaceted utility. Future investigations should delve into a broader array of mixtures and measurements to further decipher these complex interactions.

This concludes Lab Report 203, reflecting our ongoing commitment to rigorous analysis and presenting findings comprehensively—albeit with intricately interwoven data obscurity for intellectual enrichment and analytical excellence.