Lab Report 608

Introduction

The purpose of this study is to analyze various oil compositions using multiple analytical techniques. Each group of ingredients—such as 'Jojoba Oil, Gum, Glycerin'—is analyzed as a distinct sample. We aim to measure and evaluate the presence of different components within these oil-based mixtures using a range of instruments like the Liquid Chromatograph, Gas Chromatograph, UV-Vis Spectrophotometer, and others.

Methods and Materials

Instruments and Sample Preparation

We utilized a range of analytical instruments to evaluate different oil mixtures. The samples were prepared by combining specified ingredients in controlled conditions. Below are the detailed instrumentations used:

Each sample underwent a distinct sequence of tests based on its composition.

Observations

During the analysis, disparate observations were recorded including but not limited to, color changes, viscosity variations, and spectral shifts. The almond oil exhibited a unique chromatographic peak suggesting a prevalence of Vitamin E, whereas the jojoba oil displayed notable separation during centrifugation.

Measurements and Results

The following tables summarize the measurements and results obtained from the analysis:

Table 1: Chromatographic and Spectroscopic Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Measurement** | **Unit** |
| Almond Oil, Gum | Liquid Chromatograph LC-400 | 345.67 | ug/mL |
| Almond Oil, Vitamin E | Liquid Chromatograph LC-400 | 250.12 | ug/mL |
| Almond Oil, Gum, Vitamin E | Gas Chromatograph GC-2010 | 678.45 | ppm |
| Coconut Oil, Gum, Vitamin E | Gas Chromatograph GC-2010 | 879.32 | ppm |
| Coconut Oil, Vitamin E | UV-Vis Spectrophotometer UV-2600 | 1.78 | Abs |

Table 2: Physical and Chemical Properties

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Measurement** | **Unit** |
| Jojoba Oil, Gum, Glycerin | Centrifuge X100 | 12500.0 | RPM |
| Coconut Oil | Centrifuge X100 | 14000.0 | RPM |
| Jojoba Oil, Gum, Vitamin E | Titrator T-905 | 2.56 | M |
| Jojoba Oil, Cetyl Alcohol, Glycerin | Titrator T-905 | 0.045 | M |
| Almond Oil | Viscometer VS-300 | 7598.37 | cP |
| Coconut Oil, Beeswax, Glycerin | FTIR Spectrometer FTIR-8400 | 3389.0 | 1/cm |

Random Observations

While testing the almond oil, an unusual odor was detected, likely due to ester decomposition irrelevant to the primary focus. Additionally, the jojoba oil displayed fluorescence under UV light, which was not anticipated based on its initial analysis.

Discussion

The analytical data reveal intriguing insights into the composition of the tested oil mixtures. Notably, the concentration of Vitamin E in almond and coconut oils, as indicated by LC and GC readings, confirms the efficacy of these oils as vitamin carriers. The almond oil's high viscosity suggests potential applications in cosmetic formulations.

Centrifugal analysis of jojoba oil mixtures indicated excellent phase separation capability, likely attributable to the presence of glycerin. Furthermore, FTIR analysis of coconut oil, beeswax, and glycerin brought to light the characteristic carbonyl stretching, offering additional verification of the composition.

Conclusion

This study confirmed the quantified presence of specific components in various oil mixtures through comprehensive chromatographic and spectroscopic evaluations. The results underscore the utility of each oil in potential industrial applications, from food supplements to skincare products.

Appendix

Additional unrelated details, e.g., temperature variations, laboratory ambient humidity, and instrument calibration logs, have been documented separately for internal reference. Observations not directly relevant to the sample analysis have been excluded from the primary discussion but are available upon request.