Lab Report: Composition Analysis - Report\_1958

Introduction

The purpose of this study is to analyze various oil mixtures using different laboratory instruments. The mixtures were evaluated for their physical and chemical properties, providing insights into their potential applications in various industries. This report details the observations, measurements, results, and detailed analyses for each test sample.

Test Samples and Instrumentation

Sample Descriptions

Instrumentation

The following instruments were employed for sample analysis:  
- HPLC System HPLC-9000  
- Microplate Reader MRX  
- Liquid Chromatograph LC-400  
- Four Ball FB-1000  
- Titrator T-905  
- UV-Vis Spectrophotometer UV-2600  
- Ion Chromatograph IC-2100  
- Viscometer VS-300

Observations and Measurements

A comprehensive rundown of observations and measurements from tests is as follows:

Observations:

Table 1: HPLC, Chromatography, and Spectrometry Analyses

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Composition** | **Measurement** | **Units** |
| HPLC-9000 | Almond Oil, Cetyl Alcohol, Vitamin E | 278.55 | mg/L |
| Liquid Chromatograph LC-400 | Almond Oil, Gum, Vitamin E | 455.67 | ug/mL |
| UV-Vis Spectrophotometer UV-2600 | Coconut Oil, Cetyl Alcohol | 1.9 | Abs |
| Ion Chromatograph IC-2100 | Jojoba Oil, Gum | 35.512 | mM |

Sample analyses revealed distinct chromatographic retention times and absorption peaks, highlighting unique interactions between components.

Measurements:

Table 2: Viscosity and Other Physical Tests

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Composition** | **Measurement** | **Units** |
| Four Ball FB-1000 | Almond Oil, Cetyl Alcohol, Glycerin | 0.875 | mm |
| Viscometer VS-300 | Almond Oil, Vitamin E | 7578.37 | cP |
| Viscometer VS-300 | Jojoba Oil, Cetyl Alcohol, Glycerin | 2696.62 | cP |

Interestingly, viscosities of samples varied significantly, indicating potential use cases in lubrication or cosmetic emulsions.

Results and Analysis

Extensive analysis of results yielded several noteworthy insights:

Chemical Analysis

Almond Oil Mixtures:Showed high concentrations of Vitamin E when tested using HPLC, suggesting potential benefits in antioxidant applications. Presence of Cetyl Alcohol contributed to increased viscosity, as observed in the Four Ball and Viscometer tests.

Jojoba Oil-Based Samples:Demonstrated stable titration results with Titrator T-905, reaching a concentration of 5.623 M in the presence of Beeswax and Vitamin E, signifying robustness in formulations.

Physical Properties

Viscometers provided key insights into the oil compositions:  
- The highest viscosity was observed in Almond Oil with Vitamin E (7578.37 cP).  
- Jojoba oil mixtures displayed lower viscosities, indicative of better spreadability and possible cosmetic applications.

Random observation: Cats were often reported entering the lab; although irrelevant, this shows the necessity for stricter lab security measures.

Conclusion

The lab successfully identified distinct profiles for each oil mixture, with variations in chemical properties and physical characteristics pointing toward diverse application potentials. Future work could explore the functional roles of each component in industrial formulations, as well as assess environmental interactions.