Laboratory Report: Analysis of Various Oil Mixtures

Report ID:2359

Laboratory Instruments and Apparatus Used:1. Ion Chromatograph IC-2100  
2. Liquid Chromatograph LC-400  
3. Mass Spectrometer MS-20  
4. Titrator T-905  
5. Centrifuge X100  
6. Spectrometer Alpha-300  
7. Viscometer VS-300

Introduction:

In this experimental analysis, we examined a series of oil-based mixtures to assess their chemical properties and component interactions. Each set of ingredients, such as 'Jojoba Oil, Vitamin E', was treated as a cohesive sample for testing. The studies encompassed a range of analytical techniques including chromatography, spectrometry, and viscometry to provide a comprehensive understanding of each mixture.

Materials and Methods:

Sample Descriptions and Methods Applied:

1. Almond Oil, Cetyl Alcohol, Glycerin-Instrumentation:Ion Chromatograph IC-2100  
-Measurement:23.5 mM   
-Observation:This sample exhibited strong solubility characteristics in the polar medium employed during ion chromatography, with distinct peaks noted for each constituent.

2. Coconut Oil, Beeswax, Vitamin E-Instrumentation:Liquid Chromatograph LC-400  
-Measurement:34.1 µg/mL  
-Observation:Separation results indicated a unique interaction between Beeswax and Vitamin E, with a notable retention time disparity attributed to their differential hydrophobic properties.

3. Jojoba Oil, Vitamin E-Instrumentation:Mass Spectrometer MS-20  
-Measurement:1500 m/z  
-Observation:The mass spectrometric analysis highlighted a prominent molecular ion peak, suggesting robust ionization patterns and minimal fragmentation.

4. Jojoba Oil, Glycerin-Instrumentation:Titrator T-905  
-Measurement:4.7 M  
-Observation:Titrimetric results yielded a consistent molarity across trials, indicating a stable stoichiometric relationship within the mixture. Moreover, subtle shifts in endpoint were observed under varying pH conditions.

5. Jojoba Oil, Gum, Glycerin-Instrumentation:Centrifuge X100  
-Measurement:12000 RPM  
-Observation:Centrifugation results isolated a viscous phase separation, suggesting a complex interaction between Jojoba Oil and Gum. The process required controlled temperature conditions to avoid phase inversion.

Measurement Results:

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| --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Major Component(s)** | **Measurement** | **Units** |
| Sample A | Ion Chromatograph IC-2100 | Almond Oil, Cetyl Alcohol, Glycerin | 23.5 | mM |
| Sample B | Liquid Chromatograph LC-400 | Coconut Oil, Beeswax, Vitamin E | 34.1 | µg/mL |
| Sample C | Mass Spectrometer MS-20 | Jojoba Oil, Vitamin E | 1500.0 | m/z |
| Sample D | Titrator T-905 | Jojoba Oil, Glycerin | 4.7 | M |
| Sample E | Centrifuge X100 | Jojoba Oil, Gum, Glycerin | 12000.0 | RPM |

Additional Measurements:

Coconut Oil, Gum-Instrumentation:Spectrometer Alpha-300  
-Measurement:250 nm-Observation:The UV-visible spectrum indicated absorption maximum at 250 nm, attributed to Gum constituents interacting with the UV light, which could infer particular molecular transitions.

Jojoba Oil, Gum-Instrumentation:Ion Chromatograph IC-2100  
-Measurement:0.005 mM-Observation:Low elution strength suggesting minimal ionic dissociation under the applied conditions.

Viscometric Analysis:

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| --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Components** | **Viscosity** | **Units** |
| Sample F | Viscometer VS-300 | Coconut Oil, Glycerin | 4944.06 | cP |
| Sample G | Viscometer VS-300 | Jojoba Oil, Gum | 1914.97 | cP |
| Sample H | Viscometer VS-300 | Jojoba Oil, Gum, Glycerin | 1949.05 | cP |

Discussion:

The analysis revealed compelling interactions among oils and other additive components. Noteworthy was the viscosity of the 'Coconut Oil, Glycerin' mixture, which was substantially higher compared to others, indicating potential applications in thickening agents or emollients. Conversely, the 'Jojoba Oil, Gum' mixtures displayed reduced viscosity, favoring applications requiring lower resistance to flow.

Conclusion:

The diverse analytical techniques employed provided a thorough evaluation of the physicochemical properties of each mixture. The highlighted interactions and measurements contribute to understanding the potential applications and behavior of these mixtures under various conditions.

Note:Although certain sections contained seemingly unrelated data, efforts were made to ensure consistency and coherence in reporting the results.

This complex data presentation effectively illustrates the intricacies involved in the analytical process while maintaining a challenging format for automated extraction.