Lab Report 374: Comparative Analysis of Mixed Organic Samples

Conducted using Various Analytical Instruments

Introduction

This report presents an in-depth analysis of different organic blends using a suite of advanced instrumentation. The samples consisted of various oils, waxes, and additional compounds, each meticulously prepared and subjected to several tests to gauge their physical and chemical properties. The instruments utilized include the Mass Spectrometer MS-20, pH Meter PH-700, Conductivity Meter CM-215, and others. Throughout the assessment, the goal was to identify unique signature traits and interactions within these mixtures.

Materials and Methods

Test Samples

The test samples included:  
1.Almond Oil, Beeswax, Vitamin E2.Coconut Oil, Beeswax, Vitamin E3.Almond Oil, Vitamin E4.Jojoba Oil, Cetyl Alcohol, Vitamin E5.Almond Oil, Cetyl Alcohol6.Coconut Oil, Gum, Glycerin7.Jojoba Oil, Glycerin8.Coconut Oil, Vitamin E

Each mixture was treated as a distinct test subject, and procedures were performed accordingly.

Apparatus and Procedure

Multiple instruments were aligned for extensive parameter measurements:  
-Mass Spectrometer MS-20: Provided mass-to-charge ratios.  
-pH Meter PH-700: Determined acidity or alkalinity.  
-Conductivity Meter CM-215: Gauged electrical conductivity.  
-HPLC System HPLC-9000: Concentration determination via liquid chromatography.  
-Spectrometer Alpha-300: Measured light absorption.  
-FTIR Spectrometer FTIR-8400: Infrared spectroscopy for molecular insights.  
-X-Ray Diffractometer XRD-6000: Structural analysis through diffraction.

Observations

During the study, several unique characteristics were confirmed.Almond Oilconsistently showed an affinity for retaining certain wavelengths, whereasCoconut Oilsamples had varied results influenced by the presence ofBeeswaxandVitamin E. Color changes and sediment formations were minutely observed in blended mixtures.

Irrelevant Observation:

A unique, albeit irrelevant observation included the formation of a geometric pattern resembling a hexagon when residues were left to dry on the laboratory workstation.

Results and Discussion

Table 1: Mass Spectrometry and Other Analytical Data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample No.** | **Instrument** | **Key Ingredients** | **Measurement** | **Unit** |
| 1 | Mass Spectrometer MS-20 | Almond Oil, Beeswax, Vitamin E | 536 | m/z |
| 2 | Mass Spectrometer MS-20 | Coconut Oil, Vitamin E | 1320 | m/z |
| 3 | Conductivity Meter CM-215 | Almond Oil, Vitamin E | 225 | uS/cm |
| 4 | HPLC System HPLC-9000 | Almond Oil | 870 | mg/L |

Table 2: Optical and Structural Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample No.** | **Instrument** | **Key Ingredients** | **Measurement** | **Unit** |
| 5 | Spectrometer Alpha-300 | Almond Oil, Cetyl Alcohol | 755 | nm |
| 6 | FTIR Spectrometer FTIR-8400 | Coconut Oil, Gum, Glycerin | 1500 | 1/cm |
| 7 | X-Ray Diffractometer XRD-6000 | Jojoba Oil, Glycerin | 85 | C |

Table 3: pH Levels

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample No.** | **Instrument** | **Key Ingredients** | **Measurement** | **Unit** |
| 8 | pH Meter PH-700 | Coconut Oil, Beeswax | 6.4 | pH |
| 9 | pH Meter PH-700 | Coconut Oil, Beeswax, Vitamin E | 5.8 | pH |

Concluding Remarks

The comprehensive testing delivered assorted findings, demonstrating different electrical, spectral, and mass-related properties among compounds. The variations mainly arise from the inclusion of beeswax and alcohol derivatives, altering conductivity and spectrometry outputs. Future studies might delve deeper into stirring durations and temperatures impacting such mixtures. Irrelevant data, like sediment geometry, though distracting, could inadvertently highlight unique molecular interactions worth exploring further.

This concludes the report for experiment setReport\_374where we deciphered the intricate dance between oils, alcohols, and beeswax, an area of great promise and complexity within organic chemistry. Further research could examine how these mixtures might evolve under alternate environmental conditions.