Lab Report 1072: Analysis of Oil Mixtures Using Various Instruments

Introduction

In this report, we have meticulously examined various oil mixtures using advanced instrumental techniques. This analysis focuses on the diverse properties and interactions of compounds within specific ingredient combinations. Such mixtures were subjected to an array of instruments, each yielding unique data that enhances our understanding of these complex systems.

Test Samples and Equipment

We employed several sophisticated instruments to analyze distinct groups of components:

Ingredients: Almond Oil, Gum, Vitamin E / Almond Oil, Beeswax, Glycerin.

Jojoba Oil Mixtures

Ingredients: Jojoba Oil, Gum, Vitamin E.

Coconut Oil Mixtures

Data Tables

Table 1: Gas Chromatography and Spectroscopy Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Test Sample** | **Detected Substances** | **Wavelength (nm) or Concentration (ppm)** |
| Gas Chromatograph GC-2010 | Almond Oil, Gum, Vitamin E | Multiple Compounds | 450 ppm |
| Spectrometer Alpha-300 | Almond Oil, Gum, Vitamin E | Light Absorbance | 650 nm |

Table 2: Physicochemical Properties

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Test Sample** | **Detected Substances** | **Value** | **Units** |
| Rheometer R-4500 | Almond Oil, Beeswax, Glycerin | Viscosity | 12.5 | Pa-s |
| HPLC System HPLC-9000 | Almond Oil, Beeswax, Glycerin | Glycerin Content | 750.0 | mg/L |
| Microplate Reader MRX | Jojoba Oil | Optical Density | 2.5 | OD |
| Conductivity Meter CM-215 | Jojoba Oil, Gum | Conductivity | 1500.0 | uS/cm |

Table 3: Additional Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Test Sample** | **Detected Substances** | **Measurement** | **Units** |
| UV-Vis Spectrophotometer UV-2600 | Jojoba Oil | Absorbance | 1.8 | Abs |
| X-Ray Diffractometer XRD-6000 | Coconut Oil, Gum | Thermal Property | 120.0 | °C |
| Viscometer VS-300 | Jojoba Oil, Gum, Vitamin E | Viscosity | 1875.62 | cP |
| Viscometer VS-300 | Coconut Oil, Gum, Vitamin E | Viscosity | 5204.15 | cP |
| Viscometer VS-300 | Almond Oil, Beeswax, Glycerin | Viscosity | 7145.2 | cP |

Observations & Interpretation

The Almond Oil mixtures displayed notable characteristics under several measurement conditions. For instance, their GC and HPLC analyses revealed distinct profiles vis-à-vis their chemical composition. The varying viscosities demonstrated by the Rheometer and Viscometer allude to their potential applications in diverse industries, such as cosmetics and lubricants.

Coconut Oil samples, when exposed to X-ray diffraction and PCR, demonstrated significant structural and reactive properties, marked by a high viscosity and specific heat response patterning at 120 °C.

The Conductivity Meter revealed that Jojoba Oil samples had substantial ionic presence, indicating potential electrical applications. The UV-Vis spectral analysis contributed insights into their absorptive behavior under various light conditions.

Conclusion

The report underscores the nuanced behaviors of oil mixtures under different analysis modes. The interplay of gums and other additives profoundly impacts measurements such as viscosity and absorbance. These findings enrich our comprehension of material properties, offering pathways to optimize formulations for specific industrial uses.

Note: Extraneous data and measurements may include variations due to natural sample inconsistencies or calibration drift, necessitating further investigation.