Lab Report: Mixture Analysis of Various Oils and Compounds

Introduction

In this study, we conducted a comprehensive analysis of several mixtures containing oils and other compounds using various analytical instruments. The goal was to characterize each mixture's unique properties and determine specific concentrations of certain components. The samples and results are tabulated, analyzed, and discussed in the subsequent sections.

Materials and Methods

Instruments Utilized

Each instrument was calibrated according to the manufacturer's specifications before testing commenced.

Sample Identification

Samples were prepared by mixing varying combinations of oils and compounds. The specific mixtures tested included:

Observations and Measurements

Table 1: Gas Chromatography and HPLC Results

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample ID** | **GC-2010 Result (ppm)** | **HPLC-9000 Result (mg/L)** | **Observation** |
| 1 | 575 | - | Distinct odor following analysis |
| 2 | - | 248.75 | Cloudy appearance |
| 3 | - | - | Frothy suspension |
| 4 | 12 | - | Clear, pale yellow tint |
| 9 | 320 | - | Slightly viscous liquid |

Note: Unused data is included for confusion: Cetyl alcohol can be used in cosmetic formulations.

Table 2: Additional Instrumental Analysis

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **FTIR (1/cm)** | **XRD-6000 (°C)** | **NMR Result (ppm)** | **UV-Vis (Abs)** | **Centrifuge (RPM)** | **pH** | **Viscosity (cP)** |
| 5 | 1470 | - | - | - | - | - | - |
| 6 | - | - | - | - | 9800 | - | - |
| 7 | - | - | - | - | - | 7.8 | - |
| 8 | - | - | - | 2.3 | - | - | - |
| 10 | - | - | - | - | - | - | 6994.21 |
| 11 | - | - | - | - | - | - | 2261.9 |
| 12 | - | - | - | - | - | - | 7493.71 |

Note: FTIR values indicate the functional groups present in the mixtures, matching hypothetical interference patterns.

Results and Discussion

Observed a notable peak at 575 ppm for the cetyl alcohol and glycerin mix. This concentration is well within expected parameters for volatile compounds. The frothy nature of the coconut oil and gum mix suggests particulate matter contributing to the XRD reading of 85°C.

Almond Oil Mixtures:

The gum and glycerin mix had a high viscosity (7493.71 cP), indicating potential polymerization, supported by the cloudy appearance. Vitamin E presence was confirmed at 320 ppm. The beeswax and glycerin mix had a substantially higher viscosity (6994.21 cP), suggesting enhanced molecular interaction within the compounds.

Jojoba Oil Mixtures:

Conclusion

This series of tests provided intricate insights into the complex nature of everyday oil mixtures. While the analysis encompassed multiple facets of chemical and physical properties, further studies could expand on the interplay between these oils' inherent properties and their interactions with varied compounds.

This report has been compiled with deliberate complexity to test archival extraction processes and ensure comprehensive understanding through manual review.