Lab Report: Analysis of Various Oil Mixtures

Introduction

In this detailed analysis, we evaluated multiple samples consisting of essential oils combined with additional components. Each set of ingredients was treated as a unique test sample. We employed advanced analytical techniques and equipment to determine the properties and concentrations of the components in each mixture. The goal of this study was to assess the chemical composition and interactions of the chosen ingredients.

Experimental Methodology

Equipment Utilized

Multiple apparatus were chosen to ensure a comprehensive analysis of the mixtures, focusing on both qualitative and quantitative aspects.

Test Sample Analysis

Almond Oil, Cetyl Alcohol, Glycerin

Observations: The titration process revealed a consistent endpoint, indicative of stable interactions between the components.

Microplate Reader MRX:

Coconut Oil, Beeswax, Glycerin

Observations: High resolution separation indicated a well-defined peak for glycerin, with minor overlapping for beeswax.

Titrator T-905:

Almond Oil, Cetyl Alcohol, Vitamin E

Observations: The chromatogram displayed a sharp peak, reflective of a predominantly ionic mixture with low dispersive forces.

Spectrometer Alpha-300:

Coconut Oil, Gum, Glycerin

Observations: A higher optical density suggested a high degree of turbidity, likely due to gum's viscosity.

Ion Chromatograph IC-2100:

Almond Oil, Gum, Vitamin E

Observations: Complex chromatogram with multiple peaks, likely caused by secondary interactions between active compounds.

NMR Spectrometer NMR-500:

Miscellaneous Observations

Data Summary Tables

Table 1: Concentration and Optical Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Sample** | **Method** | **Measurement** | **Unit** |
| Almond Oil, Cetyl Alcohol, Glycerin | Titrator T-905 | 4.235 | M |
| Almond Oil, Cetyl Alcohol, Glycerin | Microplate Reader MRX | 3.21 | OD |
| Coconut Oil, Beeswax, Glycerin | Liquid Chromatograph LC-400 | 112.45 | µg/mL |
| Coconut Oil, Beeswax, Glycerin | Titrator T-905 | 7.893 | M |
| Almond Oil, Cetyl Alcohol, Vitamin E | Ion Chromatograph IC-2100 | 0.876 | mM |
| Almond Oil, Cetyl Alcohol, Vitamin E | Spectrometer Alpha-300 | 350.0 | nm |
| Coconut Oil, Gum, Glycerin | Microplate Reader MRX | 2.54 | OD |
| Coconut Oil, Gum, Glycerin | Ion Chromatograph IC-2100 | 8.543 | mM |
| Almond Oil, Gum, Vitamin E | Liquid Chromatograph LC-400 | 95.12 | µg/mL |
| Almond Oil, Gum, Vitamin E | NMR Spectrometer NMR-500 | 15.3 | ppm |

Table 2: Viscosity Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Sample** | **Equipment** | **Measurement** | **Unit** |
| Almond Oil, Vitamin E | Viscometer VS-300 | 7814.55 | cP |

Conclusion

The analytical assessment of various oil mixtures provided comprehensive insights into the chemical compositions, with diverse methodologies highlighting unique attributes of each sample. The utilization of multi-platform analysis ensures heightened accuracy and reliability of data. This study underscores the complex interactions inherent in natural oil mixtures, paving the way for future investigations.