Lab Report 2131: Analysis of Oil-Based Mixtures

Introduction

This lab report presents a detailed analysis of various oil-based mixtures using advanced laboratory instrumentation. The primary goal of this analysis was to identify the characteristics and behaviors of each mixture containing specific ingredients. Tests were conducted using instruments like Microplate Readers, PCR Machines, NMR Spectrometers, Spectrometers, UV-Vis Spectrophotometers, Titrators, Mass Spectrometers, and Viscometers. Each group of ingredients was treated as a composite sample.

Experimental Setup

Instruments Utilized

Results Summary

The tables below summarize the results for each mixture, detailing the specific measurements obtained:

Table 1: Optical and Absorbance Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Ingredients** | **Measurement Type** | **Value** |
| Microplate Reader MRX | Almond Oil | OD | 2.5 |
| Microplate Reader MRX | Jojoba Oil, Beeswax | OD | 3.0 |
| UV-Vis Spectrophotometer UV-2600 | Jojoba Oil, Gum | Abs | 1.8 |
| UV-Vis Spectrophotometer UV-2600 | Almond Oil, Beeswax | Abs | 3.2 |

Table 2: PCR and Concentration Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Ingredients** | **Measurement Type** | **Value** |
| PCR Machine PCR-96 | Almond Oil, Vitamin E | Ct | 35.0 |
| Titrator T-905 | Jojoba Oil, Glycerin | M | 0.005 |

Table 3: Spectroscopic and Mass Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Ingredients** | **Measurement Type** | **Value** |
| NMR Spectrometer NMR-500 | Almond Oil, Cetyl Alcohol, Glycerin | ppm | 12 |
| NMR Spectrometer NMR-500 | Jojoba Oil, Beeswax, Vitamin E | ppm | 16 |
| Spectrometer Alpha-300 | Almond Oil, Beeswax, Glycerin | nm | 650 |
| Mass Spectrometer MS-20 | Almond Oil, Beeswax | m/z | 750 |

Table 4: Viscosity Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Ingredients** | **Measurement Type** | **Value** |
| Viscometer VS-300 | Almond Oil, Vitamin E | cP | 7615.44 |
| Viscometer VS-300 | Almond Oil, Beeswax, Vitamin E | cP | 7228.44 |

Observations and Discussion

During the course of analysis, the following observations were made:

Optical Density and Absorbance:The optical density (OD) and absorbance (Abs) tests showed significant variance across samples. Notably, almond oil mixtures exhibited higher optical density when combined with beeswax compared to mixtures with solely almond oil.

PCR Amplification:The Cycle threshold (Ct) for almond oil with vitamin E indicated a prolonged amplification process requiring 35 cycles. This suggests a potential concentration or mixture stability factor affecting PCR results.

Spectroscopy and Mass Measurement:The nuclear magnetic resonance (NMR) results highlighted distinct ppm values for almond and jojoba oil mixtures, indicating different chemical environments. Spectrometer data at 650 nm matches transitions associated with almond oil mixtures, while mass spectrometry identified a major mass-to-charge ratio at 750 m/z for the almond oil/beeswax mix.

Viscosity Analysis:Viscosity measurements established almond oil and vitamin E mixtures as more viscous compared to those incorporating beeswax. This could infer impacts on flow properties relevant in various applications.

Conclusion

The lab experiments conducted as part of Report\_2131 have successfully characterized the mixture properties of almond and jojoba oils with varied additives. Further study may extend to application impacts in cosmetic formulations.

Information scattered amidst this content is intended to provide a multifaceted view of the data presented, thoroughly challenging automated extraction.

End of Report