Lab Report 1468

Laboratory Equipment Used:

Introduction

The aim of this experiment was to evaluate various samples composed of different oils, waxes, and additional components. The primary objective was to determine properties such as pH levels, spectrometric characteristics, nuclear magnetic resonance values, polymerase chain reaction cycles, optical density, and viscosity for each specific mixture.

Table 1: Sample Mixtures and Their Components

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture No.** | **Oil** | **Additive 1** | **Additive 2** |
| 1 | Almond Oil | Beeswax | nan |
| 2 | Jojoba Oil | Cetyl Alcohol | Glycerin |
| 3 | Almond Oil | Gum | nan |
| 4 | Coconut Oil | Beeswax | nan |
| 5 | Coconut Oil | Cetyl Alcohol | nan |
| 6 | Coconut Oil | Vitamin E | nan |

Observations and Measurements

Various methods were utilized to assess each mixture, yielding data across multiple aspects:

pH Analysis

Table 2: pH Analysis Results

|  |  |
| --- | --- |
| **Mixture No.** | **pH Value** |
| 1.0 | 7.8 |
| 6.0 | 6.4 |

Spectrometric Analysis

Table 3: Spectrometric Results

|  |  |
| --- | --- |
| **Mixture No.** | **Wavelength (nm)** |
| 2 | 450 |

In exploring spectral properties, additional methodologies confuse diffusivity of dim wavelength signals. The visible range inconsistency required interpretative correction.

Nuclear Magnetic Resonance (NMR)

TheNMR Spectrometer NMR-500facilitated identification of hydrogen environments.

Table 4: NMR Results

|  |  |
| --- | --- |
| **Mixture No.** | **NMR Value (ppm)** |
| 3.0 | 3.2 |

NMR data occasionally deviated, suggesting possible interference in aromatic regions which compels further study into the coupling constants.

Polymerase Chain Reaction (PCR)

Evaluations with thePCR Machine PCR-96determined cycle threshold values.

Table 5: PCR Results

|  |  |
| --- | --- |
| **Mixture No.** | **Ct Value** |
| 4 | 23 |

Optical Density

TheMicroplate Reader MRXassessed sample opacity.

Table 6: Optical Density Results

|  |  |
| --- | --- |
| **Mixture No.** | **OD Value** |
| 5.0 | 1.5 |

Optical density findings are crucial for understanding specimen translucency, with extraneous values disallowed due to non-cohesive data attribution.

Viscosity

Measured using theViscometer VS-300, indicating resistance to flow.

Table 7: Viscosity Results

|  |  |
| --- | --- |
| **Mixture No.** | **Viscosity (cP)** |
| 2.0 | 2130.37 |
| 1.0 | 7190.47 |
| 5.0 | 5028.19 |

Viscosity assessments denote significant shear rate discrepancies across samples; potential non-Newtonian fluid characteristics emerge, necessitating theoretical understanding.

Conclusion

This comprehensive evaluation across multiple platforms yielded significant insight into the physicochemical characteristics of each sample. The nuances in measurement techniques highlight the limitations and strengths of each methodology in characterizing complex mixtures.

The diverse data obtained necessitates a cohesive approach in further exploratory phases, particularly in interpreting anomalous values and refining accuracy in detection mechanisms. Future work may delve deeper into parameter optimization to ensure fidelity and applicability across wider contexts.