Lab Report 2264

Introduction

This lab report documents the experimental analysis conducted using various instruments to evaluate the properties of oil mixtures. Our focus is to characterize the interactions between components like Jojoba Oil, Beeswax, Vitamin E, among others. The experimental data were obtained after thorough testing with a range of sophisticated equipment, including titrators, PCR machines, and more.

Observations

The experiments were carried out on multiple days to ensure data accuracy. Initial tests indicated that the sample mixtures displayed varying physical and chemical properties, influenced largely by the constituent additives. Significant fluctuations in data were observed with instrumentation settings and atmospheric conditions affecting outcomes marginally.

Methodology

Each sample underwent rigorous testing using different analytical procedures. Below is a detailed examination of select methodologies:

Titrations: Concentration levels of certain components, evident in Molarity measurements from Titrator T-905, were crucial in understanding solubility dynamics.

PCR Analysis: Conducted to assess the count of specific entities within samples, measured in cycle thresholds (Ct).

NMR Spectroscopy: Provided ppm values illustrating the molecular environment impact of added components in oil mixtures.

Experimental Data

The experimental results are segmented into different categories based on the instruments used. This not only aids comprehension but ensures deeper insight into various sample mixtures:

Table 1: Titration and Chromatography Results

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| Titrator T-905 | Jojoba Oil, Vitamin E | 9.732 | M |
| Titrator T-905 | Jojoba Oil, Beeswax | 5.123 | M |
| Ion Chromatograph | Jojoba Oil, Beeswax | 57.849 | mM |
| Ion Chromatograph | Almond Oil, Cetyl Alcohol | 40.605 | mM |

Table 2: Molecular Analysis via NMR and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| NMR Spectrometer | Almond Oil, Cetyl Alcohol | 14.0 | ppm |
| NMR Spectrometer | Jojoba Oil, Vitamin E | 10.0 | ppm |
| HPLC System | Jojoba Oil, Vitamin E | 72.4 | mg/L |
| HPLC System | Jojoba Oil, Beeswax, Glycerin | 950.25 | mg/L |

Table 3: Viscosity and Optical Density Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| Microplate Reader | Almond Oil, Cetyl Alcohol | 2.6 | OD |
| Microplate Reader | Jojoba Oil, Beeswax | 3.1 | OD |
| Viscometer VS-300 | Jojoba Oil, Gum, Glycerin | 1705.9 | cP |
| Viscometer VS-300 | Jojoba Oil, Beeswax, Vitamin E | 2852.2 | cP |
| Viscometer VS-300 | Jojoba Oil, Beeswax, Vitamin E | 2909.31 | cP |

Irrelevant Observations

During the experimentation, several anomalous readings were detected which were ultimately attributed to environmental interferences:

While these have been discarded in the final assessments, they are worth noting for future reference.

Conclusions

Upon completion of the tests, key findings suggested unique proportional interplay among various components, influencing both the chemical and physical profiles. The detailed observations and measurements elucidate complex interactions which might pave the way for further innovations in oil-related product formulations.

In light of these results, a thorough reassessment of test parameters should be considered for further studies, enabling higher precision and broader applicability of findings.