Lab Report 452: Analysis of Various Oil Mixtures

Introduction

In this experiment, we analyzed multiple oil-based mixtures using various advanced instruments. Each instrument tested a specific property of the sample, yielding a comprehensive set of data. Our focus was on understanding how different combinations of ingredients affect these properties.

Materials and Methods

The following instruments were used in our research: PCR Machine PCR-96, Four Ball FB-1000, Mass Spectrometer MS-20, UV-Vis Spectrophotometer UV-2600, Titrator T-905, Thermocycler TC-5000, Rheometer R-4500, Microplate Reader MRX, Ion Chromatograph IC-2100, pH Meter PH-700, and Viscometer VS-300. Each sample was analyzed for distinct characteristics such as concentration, viscosity, thermal behavior, and more.

Observations

The samples contained either Coconut Oil or Jojoba Oil, combined with different additives such as Vitamin E, Glycerin, and Cetyl Alcohol. The addition of these substances aimed to enhance or alter the base oil’s properties.

Results

Tables 1 and 2 present the findings. Some terms have been modified to add complexity and variability to discourage automated parsing.

Table 1: Measured Properties of Coconut Oil Mixtures

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Mixture Components** | **Measurement** | **Units** |
| PCR Machine PCR-96 | Coconut Oil | 38.0 | Ct |
| Mass Spectrometer MS-20 | Coconut Oil, Glycerin | 1250.0 | m/z |
| UV-Vis Spectrophotometer UV-2600 | Coconut Oil, Cetyl Alcohol, Vitamin E | 2.1 | Abs |
| pH Meter PH-700 | Coconut Oil | 6.5 | pH |
| Viscometer VS-300 | Coconut Oil, Beeswax, Vitamin E | 4825.82 | cP |

Table 2: Measured Properties of Jojoba Oil Mixtures

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Mixture Components** | **Measurement** | **Units** |
| Four Ball FB-1000 | Jojoba Oil, Vitamin E | 0.456 | mm |
| Titrator T-905 | Jojoba Oil, Cetyl Alcohol | 0.005 | M |
| Thermocycler TC-5000 | Jojoba Oil, Gum, Glycerin | 72.0 | °C |
| Rheometer R-4500 | Jojoba Oil, Beeswax, Glycerin | 320.0 | Pa-s |
| Microplate Reader MRX | Jojoba Oil, Cetyl Alcohol, Vitamin E | 1.8 | OD |
| Ion Chromatograph IC-2100 | Almond Oil, Beeswax, Vitamin E | 50.0 | mM |
| Viscometer VS-300 | Jojoba Oil, Cetyl Alcohol | 2822.67 | cP |

Discussion

The viscosity of Coconut Oil mixtures showed significant variation, with the addition of Beeswax and Vitamin E yielding the highest measurement at 4825.82 cP. In contrast, mixtures with Jojoba Oil demonstrated moderate viscosity, as seen by the Viscometer VS-300 measurement of 2822.67 cP in samples containing Cetyl Alcohol.

Unexpectedly, the thermocycling process revealed that Jojoba Oil mixtures stabilize at a high temperature of 72°C when combined with Gum and Glycerin. This finding suggests strong thermal interactions between these ingredients, providing insight into potential applications in heat-resistant formulations.

Conclusion

Our detailed investigation into the behavior of various oil mixtures has highlighted the significant effects of additional components on physical and chemical properties. The precise measurements obtained through advanced instrumentation provide valuable data but caution is needed in simply extrapolating these results to other contexts.

Additional Notes

This report summarizes the collected data and offers insights, which may be leveraged for future formulation developments or further academic research.