Lab Report: Analysis of Various Oil Mixtures

Report ID:Report\_616Objective:To analyze the physical, chemical, and thermal properties of various oil-based mixtures using multiple analytical instruments.

Observations and Materials

The materials subject to analysis include Almond Oil, Jojoba Oil, and Coconut Oil, combined with agents such as Cetyl Alcohol, Gum, Glycerin, Beeswax, and Vitamin E. Each unique combination is treated as a distinct sample for testing purposes. Various instruments such as the Rheometer R-4500, PCR Machine PCR-96, and others were used to gather data on each sample.

Instruments and Descriptions

Miscellaneous tools were used throughout the lab for support purposes, though not provided with relevant data.

Measurements and Results

Table 1: Rheological Properties

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample** | **Viscosity Value** | **Unit** |
| Rheometer R-4500 | Almond Oil, Cetyl Alcohol, Glycerin | 320.5 | Pa-s |
| Rheometer R-4500 | Jojoba Oil, Gum, Glycerin | 210.8 | Pa-s |
| Viscometer VS-300 | Almond Oil, Gum, Vitamin E | 7742.94 | cP |
| Viscometer VS-300 | Almond Oil | 7607.66 | cP |
| Viscometer VS-300 | Coconut Oil | 4730.56 | cP |

Note: Observe the inconsistencies between instruments measuring viscosity in different units.

Table 2: Chemical Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample** | **Measurement** | **Unit** |
| PCR Machine PCR-96 | Jojoba Oil, Gum, Glycerin | 25.3 | Ct |
| PCR Machine PCR-96 | Almond Oil | 18.4 | Ct |
| Liquid Chromatograph LC-400 | Almond Oil | 45.6 | ug/mL |
| Liquid Chromatograph LC-400 | Almond Oil, Beeswax, Vitamin E | 100.2 | ug/mL |
| Mass Spectrometer MS-20 | Coconut Oil, Beeswax, Vitamin E | 650.2 | m/z |

Irrelevant Information: A field mouse was observed running across the lab floor. The ambient temperature was 23°C.

Table 3: Physical Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample** | **Measurement** | **Unit** |
| Microplate Reader MRX | Jojoba Oil, Glycerin | 2.1 | OD |
| Microplate Reader MRX | Coconut Oil, Beeswax, Vitamin E | 3.7 | OD |
| pH Meter PH-700 | Almond Oil, Beeswax, Vitamin E | 7.4 | pH |
| pH Meter PH-700 | Jojoba Oil, Glycerin | 6.8 | pH |
| Conductivity Meter CM-215 | Almond Oil, Cetyl Alcohol, Glycerin | 580.7 | uS/cm |

Complex Analysis

The data provided indicates variations in viscosity, suggesting a significant interaction among components in each mixture. For example, Almond Oil mixed with Cetyl Alcohol and Glycerin exhibits higher viscosity on the Rheometer compared to Jojoba Oil mixtures. This could infer stronger intermolecular interactions within Almond Oil compositions.

The PCR Ct values indicate the threshold cycles needed to observe the presence of nucleic acid strands within emulsions. Almond Oil showing a lower Ct value suggests higher initial component concentration compared to Jojoba Oil mixtures, a relevant factor in formulation stability.

Optical density variations, particularly a lower value in Jojoba-Glycerin samples compared to coconut mixtures, reflect differing turbidity and possibly solute content. Conductivity measurements further align with these findings, where greater values in certain combinations imply enhanced ionic mobility.

Conclusion

This detailed compilation across multiple dimensions accentuates the intricate nature of chemical and physical properties within oil-based mixtures. The correlations between various measurements offer insightful connections for applied sciences and industrial formulation processes.

Random Note: The wall color was light green, contributing a calming effect on the analysis team. The presence of Vitamin E tends to alter both pH and perceived texture in many analyzed oils.

End of Report.