Lab Report: Evaluation of Natural Oils and Additives

Introduction

This report evaluates the properties of various natural oils combined with other additives, utilizing a variety of analytical instruments. The aim was to comprehensively assess the physical and chemical characteristics of these mixtures under controlled laboratory conditions. The data presented correspond to a series of tests identified as Report 1089, conducted with multiple instrumental techniques.

Materials and Methods

The following materials were used in the formulation of the test samples:  
-Oils:Coconut Oil, Jojoba Oil, Almond Oil  
-Additives:Glycerin, Gum, Beeswax, Vitamin E, Cetyl Alcohol

Instrumentation

Different instruments were deployed to measure diverse properties of the samples:  
-Thermocycler TC-5000-Microplate Reader MRX-Liquid Chromatograph LC-400-FTIR Spectrometer FTIR-8400-Rheometer R-4500-Viscometer VS-300

Results and Observations

Sample Evaluations

Observation:The sample exhibited stable viscosity at lower temperatures.

Coconut Oil, Gum, Glycerin

Observation:A turbid mixture indicating interaction between the gum and glycerin.

Almond Oil, Beeswax

Detailed Findings

Table 1: Temperature and Optical Density

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument** | **Measurement** | **Unit** |
| Coconut Oil, Glycerin | Thermocycler TC-5000 | 4.87 | °C |
| Coconut Oil, Gum, Glycerin | Microplate Reader MRX | 2.11 | OD |

Comment:The different tests reveal the variability of physical states influenced by the combinations of elements.

Table 2: Additional Physical Properties

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample Composition** | **Instrument** | **Measurement** | **Unit** |
| Jojoba Oil, Gum, Glycerin | FTIR Spectrometer | 1800.0 | 1/cm |
| Jojoba Oil, Glycerin | Rheometer | 350.0 | Pa-s |
| Coconut Oil, Glycerin | Viscometer VS-300 | 5096.64 | cP |

Discussion:The FTIR data indicates complex molecular interactions among jojoba oil, gum, and glycerin; while the rheometer evaluates the dynamic viscosity in the same set of samples.

Irrelevant Information

During the analysis, an unrelated measurement from an adjacent lab showed an unexpected rise in ambient humidity levels. This did not significantly affect the samples, but it was noted for consistency in future trials.

Conclusions

The experiments carried out provide insightful data on the interactions among natural oils and additives. The various properties measured underline the importance of instrument choice concerning the specific sample components.

Future work should focus on exploring broader conditions under varying temperatures and compositional concentrations to uncover further potential applications of these natural mixtures. The complementary nature of the instrumental techniques ensures accuracy and reliability across similar future evaluations.

Final Remarks

Careful consideration of the instruments and techniques used is critical in achieving precise measurements. Further experiments are encouraged to affirm these findings.