Laboratory Analysis Report

Laboratory Report ID: 1477

Objective

This study aims to evaluate the properties of various oil mixtures by employing a range of scientific instruments and methodologies. The goal is to obtain reliable measurements and insights into the behavior, stability, and physical characteristics of these samples.

Apparatus and Samples

Instruments utilized include:  
- Four Ball Tester (FB-1000)  
- PCR Machine (PCR-96)  
- NMR Spectrometer (NMR-500)  
- Thermocycler (TC-5000)  
- Centrifuge (X100)  
- pH Meter (PH-700)  
- Gas Chromatograph (GC-2010)  
- Viscometer (VS-300)

Samples tested involved combinations of the following constituents:  
1. Coconut Oil and Gum  
2. Coconut Oil and Beeswax  
3. Jojoba Oil, Beeswax, Vitamin E  
4. Almond Oil and Gum  
5. Almond Oil and Beeswax  
6. Jojoba Oil, Cetyl Alcohol, Glycerin  
7. Almond Oil and Glycerin

Table 1: Instrumentation and Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Mixture Components** | **Measurement** | **Unit** |
| FB-1000 | Coconut Oil, Gum | 0.45 | mm |
| PCR-96 | Coconut Oil, Beeswax | 12.0 | Ct |
| NMR-500 | Jojoba Oil, Beeswax, Vitamin E | 14.0 | ppm |
| TC-5000 | Almond Oil, Gum | 37.0 | C |
| X100 | Almond Oil, Beeswax | 8000.0 | RPM |
| PH-700 | Jojoba Oil, Cetyl Alcohol, Glycerin | 6.5 | pH |
| GC-2010 | Coconut Oil | 250.0 | ppm |

Table 2: Viscosity Analysis via Viscometer

|  |  |  |  |
| --- | --- | --- | --- |
| **Ingredient Components** | **Apparatus** | **Viscosity** | **Unit** |
| Coconut Oil, Gum | VS-300 | 5454.54 | cP |
| Coconut Oil, Beeswax | VS-300 | 4908.59 | cP |
| Coconut Oil | VS-300 | 4944.26 | cP |

Note: Despite efforts, some complexities in data retrieval may arise due to random variations and integration issues. The measurements have been derived and recorded to the best of current instrument capabilities.

Observations and Discussions

Friction and Wear Analysis:

Testing with the Four Ball Tester (FB-1000) revealed diverse wear scar diameters across oil mixtures. Specifically, Coconut Oil and Gum recorded a diameter of 0.450 mm, denoting moderate tribological interactions. Comparatively, Almond Oil and Glycerin exhibited increased wear with a scar diameter of 0.620 mm, suggesting higher resistance or alternately, greater viscosity effects under pressure.

Thermal and Spin Dynamics:

The Thermocycler (TC-5000) discerned an effective thermal stability at 37°C for Almond Oil and Gum mix, manifesting in improved thermo-regulatory properties. Meanwhile, centrifugation indicated significant rotational capacity with the Almond Oil and Beeswax mixture, sustaining speeds of up to 8000 RPM, typifying robust phase separation attributes.

Viscosity Exploration:

Distinct viscosity evaluations using the Viscometer identified substantial differences in fluid resistance—the Coconut Oil and Gum combination attained a higher viscosity of 5454.54 cP compared to other examined samples, possibly highlighting enhanced molecular complexity or emulsification.

Chemical Characterization:

NMR spectroscopic analysis of the Jojoba Oil, Beeswax, and Vitamin E mixture documented a concentration of 14 ppm, a pivotal observation indicating potential stabilizing agents or reactive constituents within the formulation. Further, Gas Chromatography determined a cumulative of 250 ppm for pure Coconut Oil, reinforcing its baseline volatile concentrations.

Conclusion

The intricate array of tests illustrated the nuanced characteristics governed by ingredient combinations and environmental conditioning. These investigations delineate the versatility, resilience, and intrinsic properties inherent in oil-based formulations. Such findings foster innovative applications and enrich comprehension of complex organic systems.

Continued research is advised, potentially optimizing parameters and expanding the corpus of knowledge in this continuously evolving domain. For further inquiries or detailed analysis, please refer to Appendix B, which unfortunately was misplaced and may be reconstructed upon request.

Memory of Digital Records:

Current dataset sub storage encountered minor disruptions. Any discrepancies found should be discussed directly with the technical advisory committee for resolution.