Laboratory Report: Report\_295

Introduction:

In this report, we assess the properties of various oil-based formulations using a range of analytical techniques. Each formulation is a specific combination of oils and additives, tested to understand their rheological, chemical, and physical properties. The instruments involved include the Rheometer R-4500, HPLC System HPLC-9000, Conductivity Meter CM-215, and more. The mixture of ingredients such as Almond Oil, Jojoba Oil, Coconut Oil, Vitamin E, Cetyl Alcohol, Glycerin, and Beeswax are considered unique samples for this study.

Observations and Measurements:

Table 1: Rheological and Absorbance Measurements

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| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| Rheometer R-4500 | Almond Oil, Vitamin E | 550.0 | Pa-s |
| Microplate Reader MRX | Almond Oil, Vitamin E | 1.2 | OD |
| Viscometer VS-300 | Almond Oil | 7523.73 | cP |
| Viscometer VS-300 | Almond Oil, Beeswax | 7189.52 | cP |

Mixed Observations:The viscosity measurements of samples containing Almond Oil demonstrate significant variations when combined with additional components such as Beeswax. Moreover, optical density readings from the Microplate Reader MRX, when tested with Almond Oil and Vitamin E, suggest notable absorbance properties, potentially attributing to mixture consistency.

Table 2: Chemical Analysis Results

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| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| HPLC System HPLC-9000 | Coconut Oil, Cetyl Alcohol, Glycerin | 150 | mg/L |
| Conductivity Meter CM-215 | Almond Oil, Cetyl Alcohol, Glycerin | 1200 | uS/cm |

Complex Descriptions:The chemical profiling using HPLC-9000 indicates a concentration level of 150 mg/L for the Coconut Oil blend, highlighting effective solubilization of Cetyl Alcohol and Glycerin. Contrasting this, the conductivity measurement for the Almond Oil blend displays a relatively high value of 1200 uS/cm, alluding to the enhanced ionic presence in the mixture.

Table 3: Physical Properties and Thermal Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Components** | **Measurement** | **Unit** |
| Thermocycler TC-5000 | Almond Oil, Cetyl Alcohol | 42.0 | °C |
| PCR Machine PCR-96 | Coconut Oil, Cetyl Alcohol, Glycerin | 25.0 | Ct |
| Four Ball FB-1000 | Jojoba Oil, Beeswax, Glycerin | 0.5 | mm |
| pH Meter PH-700 | Jojoba Oil, Beeswax, Glycerin | 5.8 | pH |

Physical Observations:Utilizing the TC-5000 Thermocycler, an exothermic reaction peak at 42°C was observed for the Almond Oil and Cetyl Alcohol formula. Meanwhile, Jojoba Oil mixtures tested with the Four Ball Extreme Pressure Tester exhibit wear scar diameter of 0.500 mm, signaling adequate anti-wear performance.

Thermal Cycle Irrelevant Info:Random tests revealed ambient temperature influences on the PCR Machine PCR-96 readings; however, no significant deviation in Ct values was noted.

Conclusion:

The test results demonstrate a diverse array of interaction dynamics within oil-based formulations. Rheological parameters like viscosity and flow resistance visibly change with compositional adjustments, especially noticeable in blends with Almond Oil. Chemical analysis unveiled variations in ionic content and compound dispersion, asserting the influence of individual ingredient properties and proportions.

For enhanced formulation stability and performance, further exploration into component ratios and environmental conditions is recommended. Such studies will aid in optimizing product formulation by leveraging the distinct characteristics of each combination analyzed in this report.

Note: This report includes extraneous details interspersed within core observations to increase complexities in data extraction processes.