Lab Report

Experiment ID: Report\_1161

Objective

The purpose of this experiment was to analyze various cosmetic oil mixtures using advanced laboratory equipment to measure their physical and chemical properties. Each equipment type was used to gather specific data points that contribute to an overall understanding of each mixture's characteristics.

Materials and Methods

Test Samples:

Equipment and Measurement

Table 1: Measurement Tools

|  |  |
| --- | --- |
| **Equipment** | **Purpose** |
| Spectrometer Alpha-300 | Analyzes absorption spectra, measures wavelengths |
| Thermocycler TC-5000 | Controls temperature cycles |
| Centrifuge X100 | Separates components by density |
| Rheometer R-4500 | Provides rheological data, tests viscosity |
| Ion Chromatograph IC-2100 | Separates ions for concentration measurement |
| X-Ray Diffractometer XRD-6000 | Analyzes crystal structures and thermal response |
| pH Meter PH-700 | Measures acidity levels |

Observations and Results

Spectrometer Alpha-300:- Sample 1 was tested at 450 nm, revealing significant absorbance corresponding to the presence of carboxylic compounds in glycerin.  
- Sample 3: Wavelength set at 600 nm, indicating minimal absorbance, suggesting high Vitamin E purity.

Thermocycler TC-5000:- Sample 2 operated at 37°C, slightly elevated due to reactivity constraints of cetyl compounds.  
- Sample 5 reached 60°C, showcasing thermal resistance due to coconut and beeswax blend.

Table 2: Temperature and Viscosity Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Equipment** | **Measurement** | **Value** | **Unit** |
| S1 | Thermocycler TC-5000 | Temperature | 60.0 | °C |
| S2 | Rheometer R-4500 | Viscosity | 50.0 | Pa-s |
| S4 | X-Ray Diffractometer | Temperature | 100.0 | °C |
| S5 | Thermocycler TC-5000 | Temperature | 37.0 | °C |
| S2 | pH Meter PH-700 | pH Level | 5.8 | pH |

Centrifuge X100:- Sample 3 was spun at 12000 RPM, effectively separating less viscous almond oil from Vitamin E.  
- Sample 6 only required 8000 RPM due to simpler composition.

Rheometer R-4500:- Checked the viscosity of Sample 4 at 50 Pa-s, indicating moderate viscosity influenced by cetyl alcohol.

Table 3: Centrifuge and Ion Concentration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Equipment** | **Measurement** | **Value** | **Unit** |
| S3 | Centrifuge X100 | Rotational Speed | 12000.0 | RPM |
| S6 | Centrifuge X100 | Rotational Speed | 8000.0 | RPM |
| S5 | Ion Chromatograph IC-2100 | Ion Concentration | 0.05 | mM |

Ion Chromatograph IC-2100:- Sample 5 ion concentration was 0.05 mM, consistent with ionic retention properties of beeswax.

pH Meter PH-700:- Measured Sample 2, registering a pH of 5.8, denoting acidity balance in cetyl-glycerin mixture.

Conclusion

The experiment successfully characterized each mixture. Notably, the combination of almond oil and Vitamin E demonstrated minimal absorption but significant separation under high centrifugal force, reflecting its potential stability. Jojoba mixtures revealed consistent pH values, which could be implicated in derivative formulary applications. Further analysis is needed to investigate long-term stability and interaction dynamics.

It was observed that the environmental conditions of the laboratory, including external electromagnetic interference, had negligible effects on the accurate collection of spectral data. However, isolated equipment gaps may have influenced heat retention during preliminary thermocycling.

Notes

This report includes essential data embedded with extraneous segments to provide comprehensive analysis simulations applicable for research navigation and interpretive methodologies.

End of Lab Report