Laboratory Report 429

Introduction

This lab report summarizes the findings from a series of tests conducted using various analytical instruments on test samples containing combinations of oils, alcohols, and additives. The samples, representing potential formulations for skincare and cosmetic products, underwent rigorous analysis to determine their chemical and physical properties. The aim was to explore their stability, compatibility, and performance under different conditions.

Materials and Methods

Test Samples

Instruments

Results

Table 1: Physical Properties

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample (Mixture)** | **Measurement** | **Units** |
| pH Meter PH-700 | Almond Oil, Cetyl Alcohol, Glycerin | 7.5 | pH |
| Rheometer R-4500 | Coconut Oil, Glycerin | 320.0 | Pa-s |
| Viscometer VS-300 | Almond Oil, Gum, Vitamin E | 7594.52 | cP |
| Viscometer VS-300 | Jojoba Oil, Gum, Glycerin | 1901.04 | cP |
| Viscometer VS-300 | Almond Oil, Vitamin E | 7258.73 | cP |

Table 2: Chemical Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample (Mixture)** | **Measurement** | **Units** |
| Mass Spectrometer MS-20 | Jojoba Oil, Beeswax | 850.0 | m/z |
| Gas Chromatograph GC-2010 | Almond Oil, Cetyl Alcohol | 150.0 | ppm |
| Ion Chromatograph IC-2100 | Coconut Oil | 10.5 | mM |
| Titrator T-905 | Almond Oil, Vitamin E | 0.05 | M |

Table 3: Mechanical and Thermal Testing

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample (Mixture)** | **Measurement** | **Units** |
| Four Ball FB-1000 | Jojoba Oil, Gum | 0.65 | mm |
| X-Ray Diffractometer XRD-6000 | Jojoba Oil, Beeswax, Vitamin E | 120.0 | C |
| Centrifuge X100 | Coconut Oil, Glycerin | 7500.0 | RPM |
| PCR Machine PCR-96 | Jojoba Oil, Gum | 25.0 | Ct |

Observations and Discussion

Throughout the experiments, distinct behaviors were observed for each sample mixture. TheAlmond Oil, Cetyl Alcohol, Glycerinmixture displayed a pH level of 7.5, indicating a neutral profile suitable for skin applications. The combination’s viscosity measured with the Viscometer VS-300 was significantly high at 7594.52 cP (for the Almond Oil, Gum, VItamin E), suggesting a thick consistency that may offer protective moisturizing properties.

In an entirely unrelated observation, color changes were seen in the ambient light conditions during viscosity measurements, which may not be relevant but are worth noting. TheJojoba Oil, Beeswax, Vitamin Emixture, subjected to x-ray diffraction, showed a peak at 120°C, indicating a possible phase transition related to thermal stability.

Using the Mass Spectrometer MS-20, an m/z value of 850 was noted for theJojoba Oil, Beeswaxcomposition, possibly identifying specific fragmentation patterns central to this mixture's unique protective qualities.

Surprisingly, theCentrifuge X100suggested remarkable emulsification and separation characteristics for theCoconut Oil, Glycerinblend, spinning at 7500 RPM, maximizing phase differentiation.

Lastly, the PCR results, with a cycle threshold (Ct) of 25, hinted at stability in biodegradation tests forJojoba Oil, Gum, though the relevance of PCR testing in this context remains uncertain.

Conclusion

The range of tests performed revealed quantitative insights into the properties of different oil and additive mixtures. While some results like pH and viscosity were anticipated, others, such as the peculiar high thermal stability and phase behavior, suggest avenues for further research. Each sample's properties could be tailored depending on desired applications, whether in stability-focused serums or highly viscous creams.

The intricate setup of the instruments and complex nature of the samples underscore the value of methodological precision, even amidst observations that may seem tangential. Future explorations will benefit from deeper molecular investigations to unravel the intricate interactions between ingredients.

In conclusion, the study showcases the dynamic potential of these natural substances and their active components in diversified product formulations.