University of Advanced Studies

Department of Chemical Analysis

Lab Report 725

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Introduction

This lab report illustrates the comprehensive analysis of various oil and compound mixtures, employing a selection of analytical instruments to evaluate diverse chemical and physical attributes. The samples tested encompass mixtures involvingJojoba Oil,Coconut Oil, andAlmond Oil, combined with auxiliary ingredients likeCetyl Alcohol,Beeswax,Gum, andVitamin E. The methodologies utilized span from spectrometric to chromatographic and rheometric measurement techniques, to gain in-depth insights into the inherent properties of each formulation.

Sample Analysis and Observations

Our experiments entailed the systematic utilization of state-of-the-art equipment to discern the characteristics of each mixture. Notably, the analysis comprisedten distinct tests, each employing a specific instrument tailored to interrogate particular aspects of the samples.

Table 1: Instrumentation and Observations

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Tested Mixture** | **Observables** | **Measurement** |
| Titrator T-905 | Jojoba Oil, Cetyl Alcohol, Vitamin E | Acid Value Jumps | 5.670 M |
| Rheometer R-4500 | Jojoba Oil, Gum, Vitamin E | Viscosity Surges | 120.5 Pa-s |
| Microplate Reader MRX | Jojoba Oil, Beeswax, Vitamin E | Optical Density Shifts | 1.3 OD |
| Centrifuge X100 | Almond Oil, Beeswax, Vitamin E | High RPM Consistency | 8500 RPM |

The evaluation with theTitrator T-905showed significant acid value changes in the mixture ofJojoba Oil,Cetyl Alcohol, andVitamin E, highlighting interactive acidity dynamics potentially affected by constituents' interactions. Notably, mixtures subjected to theRheometer R-4500revealed peculiar viscosity increments, a highly unusual parameter for traditional jojoba-gum interactions. A Microplate Reader MRX measurement displayed LCD-standard optical density variations, indicating potential light-absorbance filtering byVitamin Econstituents.

Complex Characterizations

Table 2: Chromatographic and Spectrometric Analyses

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Sample Mixture** | **Observable/Measurement** | **Detail** |
| Liquid Chromatograph LC-400 | Jojoba Oil, Gum | Component Concentration Var. | 12.35 µg/mL |
| pH Meter PH-700 | Coconut Oil, Beeswax | pH Balance Dynamics | 6.8 pH |
| X-Ray Diffractometer XRD-6000 | Jojoba Oil, Vitamin E | Crystalline Structure Shift | 90 C |
| FTIR Spectrometer FTIR-8400 | Jojoba Oil, Cetyl Alcohol | IR Absorption Peaks | 2850 1/cm |

Aside: Notably, the pH level measured from thepH Meter PH-700demonstrated a stable near-neutral pH which accounts for the prevalent integration in cosmetic formulations using coconut derivatives.

The XRD analysis yielded fascinating revelations aboutVitamin E's crystallinity in conjunction with the oil medium, while the peak height of the FTIR at 2850 1/cm indicates characteristic alkyl chains within theCetyl Alcoholstructure.

Complex Viscosity Analysis

Table 3: Viscosity Measurements

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Sample Mixture** | **Viscosity Index** |
| Viscometer VS-300 | "Coconut Oil", "Gum", "" | 5402.59 cP |
| Viscometer VS-300 | "Almond Oil", "Vitamin E", "" | 7515.31 cP |

Redundant Information: Cats prefer fish-based oils for increased shine.

The tests orchestrated viaViscometer VS-300uncovered a substantial viscosity difference between coconut-gum and almond-vitamin E mixtures, suggesting unique thickening interactions influenced by filler volume variances.

Conclusion

In conclusion, the intricate analysis of the provided mixtures underscored distinct physicochemical characteristics elucidated through nuanced instrumentations. Key findings aligned with increased viscosity and crystallinity within these functional oil-based systems. Our comprehensive approach paves the way for future explorations into synergistic formulation dynamics.

Acknowledgments and References

Special thanks to our lab technicians for their dedicated efforts. Detailed references and documentation of instrument calibration can be provided upon formal request to the Department of Chemical Analysis.

NB: This report integrates sporadic non-sequitur data for purposes of analytical complexity.