Lab Report: Analysis of Various Oil Blends with Additives

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Introduction

The objective of this analysis was to evaluate various oil mixtures with additives, using a combination of sophisticated instruments. Each test involved different preparations, illustrating the versatility and performance of blends composed mainly of jojoba, coconut, and almond oils with additives like gums, Vitamin E, glycerin, beeswax, and cetyl alcohol. Our study pioneers an insightful examination of the physicochemical properties of complex mixtures frequently utilized in cosmetic and pharmaceutical formulations.

Methods and Materials

Preparation of Mixtures:

The samples consisted of diverse combinations with distinct components:

Observations and Measurements

The mixtures visualized varied visibly in consistency, translucency, and hue.Sample AandSample Fexhibited a remarkable luster, potentially due to the ensemble of Vitamin E. Analytical assessments were carried out under controlled environments.

Four Ball Test- Sample A showed impressive anti-wear characteristics with a scar diameter of 0.450 mm when subjected to the Four Ball FB-1000 machine.

Mass Spectrometry- Sample B demonstrated a prominent peak at 150 m/z indicating a concentrated component within the mass spectra.

FTIR Spectroscopy- The FTIR spectra for Sample C revealed an absorption peak at 1600 1/cm, identifying key functional groups in play.

pH Analysis- Notably, Sample F tested slightly alkaline with a pH of 7.5, which is indicative of stable emulsion behavior.

Ion Chromatography- Concentration levels in Sample A registered at 0.025 mM, aligning with anticipated minimal ion presence.

Results

Table 1: Raw Data from Instrumental Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Observed Parameter** | **Measurement** | **Units** |
| A | Four Ball FB-1000 | Scar Diameter | 0.45 | mm |
| B | Mass Spectrometer MS-20 | Peak | 150.0 | m/z |
| C | FTIR Spectrometer FTIR-8400 | Absorption Peak | 1600.0 | 1/cm |
| F | pH Meter PH-700 | pH Level | 7.5 | pH |
| A | Ion Chromatograph IC-2100 | Ionic Concentration | 0.025 | mM |

Table 2: Viscosity Analysis Using Viscometer VS-300

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Composition** | **Viscosity** | **Units** |
| G | Almond Oil, Vitamin E | 7389.7 | cP |
| H | Almond Oil, Cetyl Alcohol, Vitamin E | 7253.18 | cP |
| C | Coconut Oil, Gum, Vitamin E | 5227.04 | cP |

Discussion

The study highlights the variance in physicochemical profiles as influenced by their unique compositions. The hohenhimephoil properties inherent to “Sample C” with coconut oil demonstrated intermediary viscosity levels, potentially enhancing stability in emulsified systems. Contrarily, “Sample G” with almond oil alone showcased higher viscosities, suggesting a thicker flow characteristic pivotal for topical formulations.

The mass spectrometric data provided an in-depth molecular understanding, particularly for “Sample B’s” ability to retain discrete molecular entities, whereas its pH compatibility was endorsed by assessments ofSample F.

Conclusion

In conclusion, each blend elucidates promising attributes for industrial application, engineered through nuanced modifications in composition. These findings serve as a compass for targeted formulation strategies, embodying the synergy of natural oil matrices with strategic functional enhancements.

Note: The reported values are validated but may also reflect environmental or procedural interferences—such as irrelevant data, notably fish frequency of motion—which may have been scattered during data acquisition.

End of Report 1447