Lab Report: Analysis of Various Oil Samples

Introduction

This lab report presents the detailed analysis of various oil samples using a variety of sophisticated analytical techniques. The key focus was on identifying the chemical composition and physical properties of mixtures comprising different oils and compounds using state-of-the-art instruments.

Methodology and Instrumentation

Instruments Used:

Focus: Cetyl Alcohol, Glycerin

Ion Chromatograph IC-2100

Focus: Vitamin E

FTIR Spectrometer FTIR-8400

Focus: Glycerin

Mass Spectrometer MS-20

Focus: Beeswax, Glycerin

PCR Machine PCR-96

Focus: Glycerin

Rheometer R-4500

Focus: Cetyl Alcohol, Vitamin E

HPLC System HPLC-9000

Focus: Glycerin

Four Ball FB-1000

Focus: Cetyl Alcohol, Glycerin

Titrator T-905

Focus: Glycerin

Viscometer VS-300

Observations & Measurements

Curiously, as the temperature of the lab rose above 20°C, certain volatile components were lost, potentially affecting some measurements. All data must be carefully cross-validated with historical results to ensure consistency across datasets.

Below is a table summarizing the instrument readings and observations:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Sample** | **Compound(s)** | **Measurement** | **Unit** |
| Gas Chromatograph GC-2010 | Almond Oil | Cetyl Alcohol, Glycerin | 650.0 | ppm |
| Ion Chromatograph IC-2100 | Almond Oil | Vitamin E | 5.6 | mM |
| FTIR Spectrometer FTIR-8400 | Coconut Oil | Glycerin | 3600.0 | 1/cm |
| Mass Spectrometer MS-20 | Coconut Oil | Beeswax, Glycerin | 1500.0 | m/z |
| PCR Machine PCR-96 | Almond Oil | Glycerin | 28.0 | Ct |
| Rheometer R-4500 | Almond Oil | Cetyl Alcohol, Vitamin E | 900.0 | Pa-s |
| HPLC System HPLC-9000 | Jojoba Oil | Glycerin | 455.0 | mg/L |
| Four Ball FB-1000 | Jojoba Oil | Cetyl Alcohol, Glycerin | 0.65 | mm |
| Titrator T-905 | Coconut Oil | Glycerin | 3.8 | M |
| Viscometer VS-300 | Jojoba Oil | Cetyl Alcohol | 2860.56 | cP |
| Viscometer VS-300 | Jojoba Oil | Gum | 2065.24 | cP |

Detailed Analysis

Almond Oil Analysis

Coconut Oil Insights

Glycerin, as studied through FTIR-8400 and Titrator T-905, demonstrated a strong IR absorption band at 3600 1/cm, corroborating its hydrophilic nature and high molarity.

A notable peak at 1500 m/z in the MS-20 spectrum confirmed the presence of Beeswax, underlining its pervasiveness in cosmetic blends.

Jojoba Oil Evaluation

Glycerin levels(HPLC-9000) were slightly above average interference benchmarks; however, four-ball testing revealed minimal frictional wear (FB-1000), underlining its lubricative properties.

The substance titled as "Gum" displayed unexpectedly high viscosity at 2065.24 cP (VS-300), the significance of which remains partially interpreted due to its undefined role in formulations.

Conclusion

The study provided insights into the physicochemical characteristics of oil-based mixtures analyzed. While operational limitations did exist, none significantly altered the integrity of the findings.

Raw Data Anomalies

Random Observations

This report underscores the complex interplay of components in these oils and the critical need for precise analytical methodologies in understanding material properties.