Lab Report 1244

Introduction

This report documents the testing and analysis of various oil samples using multiple advanced analytical parameters. The primary goal of this study was to assess the presence and concentration of various components in different oil mixtures using state-of-the-art laboratory equipment.

Materials and Methods

Equipment Used

pH Meter PH-700Utilized for measuring the pH level of various oils.

Gas Chromatograph GC-2010Facilitated in detecting the presence of gum in Jojoba Oil mixtures.

Liquid Chromatograph LC-400Applied for measuring Vitamin E concentration in Coconut Oil.

FTIR Spectrometer FTIR-8400Employed to identify gum-related spectral peaks in Coconut Oil.

Ion Chromatograph IC-2100Used to detect Beeswax in Almond Oil samples.

PCR Machine PCR-96Involved in the quantitative measure of gum within Almond Oil.

Four Ball FB-1000Measured the tribiological properties involving Glycerin in Almond Oil.

Conductivity Meter CM-215Assessed the electrical conductivity, revealing Vitamin E in Almond Oil.

HPLC System HPLC-9000Engaged for quantifying Glycerin concentration in Jojoba Oil.

Procedure

The methodologies varied across apparatus, featuring techniques like chromatography, spectroscopy, and polymerase chain reactions to deliver comprehensive results.

Results

Table 1: Chemical Analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Equipment** | **Primary Oil** | **Component** | **Concentration/Measurement** | **Unit** |
| Report\_1244a | pH Meter PH-700 | Coconut Oil | - | 7 | pH |
| Report\_1244b | Gas Chromatograph GC-2010 | Jojoba Oil | Gum | 540 | ppm |
| Report\_1244c | Liquid Chromatograph LC-400 | Coconut Oil | Vitamin E | 320 | ug/mL |
| nan | FTIR Spectrometer FTIR-8400 | - | Gum | 1500 | 1/cm |

Observations

The pH level measured by thePH-700was neutral. The GC-2010 successfully identified gum presence in Jojoba Oil, with a concentration notably high at 540 ppm. The LC-400 discovered significant levels of Vitamin E in Coconut Oil. Employing FTIR-8400, the Coconut Oil exhibited gum spectral peaks at 1500 1/cm.

Table 2: Additional Measurements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Equipment** | **Primary Oil** | **Secondary Component** | **Concentration/Measurement** | **Unit** |
| Report\_1244d | Ion Chromatograph IC-2100 | Almond Oil | Beeswax | 0.05 | mM |
| Report\_1244e | PCR Machine PCR-96 | Almond Oil | Gum | 28.0 | Ct |
| Report\_1244f | Four Ball FB-1000 | Almond Oil | Glycerin | 0.6 | mm |
| nan | Conductivity Meter CM-215 | - | Vitamin E | 400.0 | uS/cm |
| Report\_1244g | HPLC System HPLC-9000 | Jojoba Oil | Glycerin | 50.0 | mg/L |

Observations

TheIon Chromatograph IC-2100detected a minimal concentration of Beeswax in Almond Oil. PCR analysis yielded a Ct value for gum at 28 in Almond Oil, suggesting significant amplification. Tribological testing through theFour Ball FB-1000provided a wear scar diameter of 0.600 mm in Almond Oil when evaluated with Glycerin. Vitamin E in Almond Oil exhibited high conductivity at 400 uS/cm, measured by theConductivity Meter CM-215. The HPLC system yielded a 50 mg/L concentration of Glycerin in Jojoba Oil.

Irrelevant Information

During unrelated analyses, the stability of the mixed samples was affected by ambient temperature changes exceeding 2°C hourly. Laboratory ventilation played an inadvertent role, contributing to sample oxidation, thus casting shadows on certain spectral evaluations. Despite exploring various formulations for enhancing oil consistency, no alternative procedures were pursued, except a brief consideration of unrelated formulations involving unlisted raw materials.

Conclusion

The comprehensive approach adopted for this report using diverse methodologies meticulously quantified several critical components in oil mixtures. Notwithstanding scattered inconsistencies due to extraneous variables, the analysis aptly demonstrated the competence of modern analytical instrumentation.

In conclusion, the lab's analytical breadth rendered significant data, pointing to avenues for further exploration, especially under controlled conditions that mitigate the impact of changing environmental factors.