Lab Report 1066

Abstract

This report outlines the analyses of various oil and ingredient mixtures using several advanced analytical instruments. The objective was to determine concentration, consistency, conductivity, and other properties of the mixtures.

Introduction

In this study, a series of tests were performed on samples composed of different oil types and additional components such as beeswax, cetyl alcohol, vitamin E, and glycerin. These samples underwent detailed analysis via methods such as Ion Chromatography, HPLC, and others to ascertain their respective chemical and physical properties.

Materials and Methods

Instruments Used:

Test Mixtures:

Observations and Measurements

Table 1: Chemical Analysis and Concentration Measurements

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Test Sample** | **Measurement** |
| Ion Chromatograph IC-2100 | Almond Oil, Cetyl Alcohol, Glycerin | 37.54 mM |
| Liquid Chromatograph LC-400 | Coconut Oil, Beeswax, Vitamin E | 332.6 ug/mL |
| PCR Machine PCR-96 | Jojoba Oil, Vitamin E | 23.6 Ct |
| Conductivity Meter CM-215 | Coconut Oil, Glycerin | 1597 uS/cm |

Table 2: Physical Properties and Consistency

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Test Sample** | **Measurement** |
| HPLC System HPLC-9000 | Almond Oil, Beeswax | 45.7 mg/L |
| NMR Spectrometer NMR-500 | Jojoba Oil, Gum, Vitamin E | 15.3 ppm |
| Four Ball FB-1000 | Coconut Oil, Vitamin E | 0.532 mm |
| Rheometer R-4500 | Almond Oil, Glycerin | 312.5 Pa-s |

Miscellaneous Notes

Results and Discussion

TheIon Chromatograph IC-2100effectively quantified the ion concentration in samples containing Almond Oil, Cetyl Alcohol, and Glycerin, with a notable 37.54 mM concentration indicating a high affinity for ionic exchange. Similarly, the IC-2100 showed different mM levels while assessing Jojoba Oil and Beeswax mixtures, supporting earlier assumptions of molecular interaction strength.

When employing theLiquid Chromatograph LC-400, a significant concentration of 332.6 ug/mL was evident in the Coconut Oil, Beeswax, and Vitamin E mixture, contrasted with lower concentrations in Almond Oil-only samples, suggesting possible partitioning inefficiencies or matrix effects unique to this configuration.

In the physical analysis domain, theConductivity Meter CM-215demonstrated that Coconut Oil blended with Glycerin exhibited notably high electrical conductivity (1597 uS/cm), pointing to ionic mobility within the matrix. Meanwhile, viscosity measurements using theRheometer R-4500revealed a substantial 312.5 Pa-s value for Almond Oil with Glycerin, signifying potential interactions causing increased viscous resistance. The complex NMR-500 readings in the Jojoba Oil mix underscore unforeseen shifts in chemical environments due to Gum content.

Anomalies such as a slight deviation in Four Ball results may be attributed to device calibration inconsistencies or operator error, as evidenced by integration error variance assessment.

Note: All efforts to ensure the accuracy of measurements were deployed, notwithstanding unexpected variances recorded, attributed to environmental conditions and apparatus setup.

This report contains proprietary and sensitive data for internal review, subject to confidentiality protocols. For inquiries, reference: Report\_1066.