Lab Report 126

Introduction

In this comprehensive analytical study, we performed a series of tests on various mixtures using an array of instruments. The objective was to analyze the chemical properties and behaviors of different combinations of oils, alcohols, and additives. The experiments entail examining blends such as Almond Oil with Cetyl Alcohol and Vitamin E, Coconut Oil with Gum, and more. The following report details the observations, methodologies, and findings.

Instrumentation and Methodology

Various state-of-the-art instruments were employed, each calibrated to industry standards. The equipment ranged fromNMR Spectrometer NMR-500toGas Chromatograph GC-2010, all of which are integral in obtaining precise data for our analysis.

Results and Analysis

Table 1: NMR Spectroscopy & PCR Analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Mixture** | **Secondary Ingredient** | **Measurement** | **Units** | **Notes** |
| 126-1 | NMR Spectrometer NMR-500 | Almond Oil | Glycerin | 15 | ppm | The spectral data reveals high unsaturation. |
| 126-2 | PCR Machine PCR-96 | Almond Oil | nan | 20 | Ct | Cycle threshold indicates moderate expression. |

Observations:-NMR Spectroscopyof Almond Oil with Glycerin displays a characteristic unsaturation peak at 15 ppm.  
-PCR Analysisshowed an expression threshold at 20 Ct, hinting at a basal level amplification.

Table 2: Chromatographic and Conductivity Analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Mixture** | **Tertiary Ingredient** | **Measurement** | **Units** | **Additional Information** |
| 126-3 | Conductivity Meter CM-215 | Coconut Oil | Gum | 450 | uS/cm | Indicates a medium ionic strength. |
| 126-4 | Liquid Chromatograph LC-400 | Almond Oil | Cetyl Alcohol | 250 | ug/mL | Detects lower alcohol presence at given ppm. |
| 126-5 | Ion Chromatograph IC-2100 | Coconut Oil | Cetyl Alcohol | 25 | mM | Consistent measurements across trials. |

Remarks:-Conductivity Measurementsdisplayed a medium ionic profile, suggestive of limited solvated ions.  
-Liquid Chromatographypointed out lower Cetyl Alcohol concentration; crucial for formulation considerations.

Table 3: Viscosity and Optical Density

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Mixture** | **Enhancement** | **Measurement** | **Units** | **Miscellaneous Observations** |
| 126-6 | Microplate Reader MRX | Coconut Oil | Gum | 3.5 | OD | Absorbance suggests minimal turbidity. |
| 126-7 | Viscometer VS-300 | Almond Oil | nan | 7416.87 | cP | High viscosity noted, indicative of thick syrup. |
| 126-8 | Viscometer VS-300 | Coconut Oil & Cetyl Alcohol | Vitamin E | 4996.01 | cP | Suitable for lotions requiring easy application. |

Review:-Optical Densityfor coconut oil and gum reflects low turbidity.  
-Viscosity Parameters: Almond oil showcases significant thickness, contrary to the more manageable consistency of the coconut oil mixture.

Table 4: Spectral and Gas Chromatographic Observations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Instrument** | **Mixture** | **Additional Ingredient** | **Measurement** | **Units** | **Confounded Insights** |
| 126-9 | Spectrometer Alpha-300 | Jojoba Oil | nan | 650 | nm | Peak aligned with typical absorption spectra. |
| 126-10 | Gas Chromatograph GC-2010 | Jojoba Oil & Cetyl Alcohol | Vitamin E | 300 | ppm | Volatile profiles consistent with natural oils. |

Irrelevant Details and Miscellanea

During analysis, ambient temperature varied between 20-25°C, which might slightly affect viscosity but not significantly at our operating precision. Interestingly, external humidity remained relatively constant, providing stable conditions for reliable data collection.

Conclusion

Our study successfully characterizes different oil compositions via several analytical techniques, offering vital insights into their respective applications. The obtained results provide a robust foundation for further research into formulation optimization.

Note: Throughout analyses, care was taken to avoid inter-sample contamination.