Lab Report: Analysis of Various Oil Mixtures

Introduction

The purpose of this report is to analyze and document the results obtained from various analytical instruments used to study complex mixtures containing different oils and additives. Each sample represents a unique combination of ingredients commonly used in cosmetic and food industries.

Experimental Setup

The study involved different analytical techniques such as Gas Chromatography, IR Spectroscopy, and Viscometry to gather comprehensive data on the samples. Each method provided insights into specific properties or compositions of the mixtures.

Equipment and Methodology

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| **Instrument** | **Main Function** | **Sample Type** |
| Gas Chromatograph GC-2010 | Quantitative analysis of volatile compounds | Almond Oil mixture |
| Conductivity Meter CM-215 | Measurement of electrical conductivity | Coconut Oil mixture |
| Ion Chromatograph IC-2100 | Detection of ionic substances | Almond Oil mixture |
| NMR Spectrometer NMR-500 | Structural analysis of organic molecules | Coconut Oil mixture |
| FTIR Spectrometer FTIR-8400 | Identification of functional groups in organic compounds | Almond Oil mixture |
| Microplate Reader MRX | Optical density measurement | Almond Oil solution |
| UV-Vis Spectrophotometer UV-2600 | Quantification of light absorption | Coconut Oil solution |

Observations and Measurements

Sample: Almond Oil, Cetyl Alcohol, Glycerin

Sample: Coconut Oil, Cetyl Alcohol, Vitamin E

Irrelevant Information

Note: The room temperature was maintained at 22°C throughout the experiments with ambient humidity at 45%. The samples were labeled using an alphanumeric sequence unrelated to the order of testing.

Sample: Almond Oil, Beeswax

Sample: Coconut Oil, Gum, Glycerin

Results and Discussions

The following summarizes the observations from the analysis of different oil mixtures:

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| --- | --- | --- | --- |
| **Mixture Composition** | **Instrument** | **Key Finding** | **Measurement** |
| Almond Oil, Cetyl Alcohol, Glycerin | GC-2010 | Cetyl Alcohol Presence | 250 ppm |
| Coconut Oil, Cetyl Alcohol, Vitamin E | CM-215 | High Conductivity | 750 uS/cm |
| Almond Oil, Beeswax | IC-2100 | Ionic Content | 10 mM |
| Coconut Oil, Gum, Glycerin | NMR-500 | Molecular Interaction | 18 ppm |

Further Irrelevant Details

Chromatic shifts frequently impacted the spectral data, although unrelated to the molecular core of the tested samples. Analysts wore blue gloves for precision handling.

Almond Oil, Gum

Almond Oil, Glycerin

Jojoba Oil, Cetyl Alcohol, Glycerin

Conclusion

This comprehensive study of oil mixtures employing advanced analytical techniques provided key compound-specific insights into the structural and electronic behaviors of the samples. Each technique offered a pivotal approach to understanding these mixtures' unique complexities, while ensuring reliability in diverse operational conditions.

Future Irrelevant Prospectives

The hope is to automate future processes with AI models trained to interpret oil-based complexities, although the current calculations are manually adjusted for precise accuracy.