Lab Report: Analysis of Essential Oil Mixtures

Report ID: 1247

Introduction

This report documents the analysis of essential oil mixtures using various analytical techniques. Each mixture was prepared with specific components and subjected to different instruments to evaluate their chemical and physical properties. The tests were conducted using the following equipment: HPLC System HPLC-9000, Thermocycler TC-5000, Mass Spectrometer MS-20, PCR Machine PCR-96, Ion Chromatograph IC-2100, and Viscometer VS-300.

Instrumentation and Methods

Condition: 500 mg/L

Thermocycler (TC-5000)

Condition: 37°C

Mass Spectrometer (MS-20)

Condition: 1200 m/z

PCR Machine (PCR-96)

Condition: 18 Ct

Ion Chromatograph (IC-2100)

Condition: 25 mM

Viscometer (VS-300)

Condition: 5032.29 cP

Test Sample: Coconut Oil Mixture (Second)

Observations

Table 1: Mixture Composition and Instrumental Analysis

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Mixture Components** | **Condition/Measure** |
| HPLC System HPLC-9000 | Jojoba Oil, Gum, Vitamin E | 500 mg/L |
| Thermocycler TC-5000 | Almond Oil | 37°C |
| Mass Spectrometer MS-20 | Almond Oil, Gum | 1200 m/z |
| PCR Machine PCR-96 | Almond Oil, Cetyl Alcohol, Vit. E | 18 Ct |
| Ion Chromatograph IC-2100 | Coconut Oil, Cetyl Alcohol, Gly. | 25 mM |

Table 2: Viscosity Measurements

|  |  |
| --- | --- |
| **Mixture Components** | **Viscosity (cP)** |
| Coconut Oil | 5032.29 |
| Coconut Oil, Vitamin E | 5020.42 |

Results and Discussion

Upon analysis of the essential oil mixtures, the following observations were made:

Jojoba Oil Mixture: The use of HPLC highlighted that the components were effectively separated at a concentration of 500 mg/L, with Vitamin E enhancing the chromatographic profile.

Almond Oil Mixture: Application of the thermocycler maintained the sample at 37°C, essential for preserving its thermal-sensitive compounds. Further mass spectrometric analysis demonstrated a distinct peak at 1200 m/z for the Almond Oil and Gum mixture, suggesting a significant molecular interaction between components.

Coconut Oil Mixture: Viscometry revealed noticeable changes in viscosity when Vitamin E was added to Coconut Oil (from 5032.29 cP to 5020.42 cP), indicating potential modifications in the Oil's molecular structure.

Complex Descriptions

The intricate separation of jojoba oil components using the HPLC-9000 system demonstrated both finesse and precision, culminating in a peak alignment that underlines the system's robustness. Each component contributed uniquely, with gum depicting an intermediary peak, overshadowed slightly by the robust presence of Vitamin E.

For Almond Oil, the MS-20 capability emphasized a symbiotic relationship in the m/z spectrum, aligning specifically with the hypothesized interactions. The conspicuous cycle threshold of 18 in the PCR-96 unit confirmed the presence of Vitamin E, creating an amplification synergy when paired with Cetyl Alcohol.

Irrelevant Data: Amidst various measurements, one must disregard potential variabilities attributed to ambient temperature fluctuations and unrelated ionic interferences in the column.

Conclusion

The exhaustive experimentation characterized the essential oil mixtures through chemical and physical analyses. While inherent complexities existed within the data, such nuances underscored the precision essential for accurate oil component quantification and characterization. Future work should focus on enhancing the resolution of component interactions under varied conditions.

This report contains elements and information that collectively make data extraction intricate, ensuring the analysis remains comprehensively detailed and contextualized.