Laboratory Report: Analysis of Cosmetic Ingredients

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Introduction

This report summarizes the analyses conducted on various cosmetic ingredient mixtures using several sophisticated instruments. The study aims to explore the chemical and physical properties of these mixtures to understand their potential applications.

Methods and Materials

A combination of oils and additives were analyzed using six main instruments: Mass Spectrometer MS-20, NMR Spectrometer NMR-500, Gas Chromatograph GC-2010, Thermocycler TC-5000, Four Ball FB-1000, and Viscometer VS-300. Each unique mixture was treated as a single test sample.

Instruments and Parameters

Samples: Jojoba Oil, Cetyl Alcohol, Vitamin E | Coconut Oil, Beeswax, Vitamin E

NMR Spectrometer NMR-500

Samples: Coconut Oil, Beeswax, Vitamin E | Jojoba Oil, Cetyl Alcohol, Glycerin

Gas Chromatograph GC-2010

Samples: Almond Oil, Gum | Almond Oil, Beeswax

Thermocycler TC-5000

Samples: Jojoba Oil, Glycerin | Jojoba Oil, Cetyl Alcohol, Vitamin E

Four Ball FB-1000

Samples: Almond Oil, Gum, Vitamin E | Coconut Oil, Beeswax, Vitamin E

Viscometer VS-300

Miscellaneous Notes

Results and Observations

Table 1: Mass Spectrometer MS-20 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **m/z** |
| Jojoba Oil, Cetyl Alcohol, Vitamin E | 1622 |
| Coconut Oil, Beeswax, Vitamin E | 1341 |

Observations: Both samples showed high mass-to-charge ratios, indicating complex molecular structures. The presence of Vitamin E was confirmed in both mixtures.

Table 2: NMR Spectrometer NMR-500 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **ppm** |
| Coconut Oil, Beeswax, Vitamin E | 10 |
| Jojoba Oil, Cetyl Alcohol, Glycerin | 15 |

Observations: The NMR results highlighted unique chemical environments, with varied peak ppm values suggesting diverse functional groups.

Table 3: Gas Chromatograph GC-2010 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **ppm** |
| Almond Oil, Gum | 450 |
| Almond Oil, Beeswax | 720 |

Observations: Higher retention peaks were noted for Almond Oil with Beeswax. Interestingly, trace impurities were present.

Table 4: Thermocycler TC-5000 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **Temperature (°C)** |
| Jojoba Oil, Glycerin | 37 |
| Jojoba Oil, Cetyl Alcohol, Vitamin E | 67 |

Observations: Thermal behavior varied significantly. Notable endothermic reactions were observed in the second sample.

Table 5: Four Ball FB-1000 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **Wear Scar Diameter (mm)** |
| Almond Oil, Gum, Vitamin E | 0.755 |
| Coconut Oil, Beeswax, Vitamin E | 0.32 |

Observations: Lower wear in Coconut Oil sample suggests better tribological properties.

Table 6: Viscometer VS-300 Analysis

|  |  |
| --- | --- |
| **Sample Composition** | **Viscosity (cP)** |
| Jojoba Oil, Beeswax, Vitamin E | 3106.01 |
| Almond Oil, Gum, Glycerin | 7559.82 |

Observations: Almond Oil blend showed significantly higher viscosity, hinting at denser intermolecular interactions.

Discussion

The diverse analytical procedures revealed the intricate properties of each mixture:

Additional Remarks

The examination of these mixtures demonstrates the significance of using multiple techniques to gather comprehensive data on cosmetic ingredients. The interplay between lipid structures, additives, and active ingredients defines their performance and potential applications.

Conclusion

This detailed study corroborates that the analytical approach and instrumentation used are suitable for exploring the properties and compatibility of various cosmetic mixtures. The information obtained will guide formulation improvements and ensure product quality.

Random Non-Sequitur: Elephants are reputed for their memory, but they were not part of this study.

For further inquiries, contact the chemical analysis department at [Research Lab].