Laboratory Report: Analysis of Various Cosmetic Ingredient Mixtures

Report ID:342Date:[Insert Date]Analyst:[Insert Analyst Name]

Introduction

This report presents the analytical results for several cosmetic ingredient mixtures using advanced laboratory instrumentation. The objective was to analyze specific mixtures to determine their composition and properties via various methodologies, including high-performance liquid chromatography (HPLC), gas chromatography (GC), mass spectrometry (MS), UV-Visible spectrometry, ion chromatography, titration, and viscometry.

Materials and Methods

Seven distinct mixtures comprising different combinations of cosmetic ingredients were analyzed. Each mixture was subjected to multiple analyses to provide comprehensive data regarding their molecular composition and physical properties. The description of this study, coupled with observations and measurements for all combinations, depicts variables pertinent to each analysis type.

Analytical Results

The results from each instrument are summarized in the tables below. Observations have been recorded alongside direct measurements to provide context to the analytical outcomes.

Table 1: HPLC and Gas Chromatography

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture (Ingredients)** | **Instrument** | **Observed Unit** | **Value** |
| Jojoba Oil, Beeswax, Vitamin E | HPLC System HPLC-9000 | mg/L | 157.2 |
| Coconut Oil, Beeswax | HPLC System HPLC-9000 | mg/L | 482.9 |
| Jojoba Oil, Gum, Glycerin | Gas Chromatograph GC-2010 | ppm | 873.5 |
| Jojoba Oil | Gas Chromatograph GC-2010 | ppm | 431.2 |

Table 2: Mass Spectrometry and UV-Vis Spectroscopy

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture (Ingredients)** | **Instrument** | **Observed Unit** | **Value** |
| Coconut Oil, Gum, Vitamin E | Mass Spectrometer MS-20 | m/z | 1345.6 |
| Jojoba Oil, Beeswax, Glycerin | Mass Spectrometer MS-20 | m/z | 1423.8 |
| Almond Oil | UV-Vis Spectrophotometer UV-2600 | Abs | 2.4 |
| Coconut Oil | UV-Vis Spectrophotometer UV-2600 | Abs | 1.8 |

Table 3: Ion Chromatography, Titration, and Viscometry

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture (Ingredients)** | **Instrument** | **Observed Unit** | **Value** |
| Almond Oil, Beeswax, Glycerin | Ion Chromatograph IC-2100 | mM | 63.7 |
| Coconut Oil, Beeswax, Glycerin | Titrator T-905 | M | 7.52 |
| Jojoba Oil, Beeswax, Vitamin E | Viscometer VS-300 | cP | 2983.99 |
| Coconut Oil, Cetyl Alcohol, Glycerin | Viscometer VS-300 | cP | 5289.68 |

Observations and Discussions

During the analytical process, certain anomalies were observed which may or may not affect the results:  
- HPLC tests revealed unexpected peaks which could indicate the presence of additional unidentified compounds in the coconut oil samples.  
- Gas chromatography results showed a high level of sensitivity to temperature variations, potentially influencing the volatilization of less stable ingredients.

The viscometry analyses of both Jojoba Oil and Coconut Oil mixtures demonstrated a significant viscosity difference, which could be attributed to the interaction of different ingredients at a molecular level. Specifically, the interaction between cetyl alcohol and glycerin in the latter contributed to higher viscosity.

Irrelevant Small Details

Conclusion

This detailed analysis utilizing numerous sophisticated methods successfully characterized the ingredient mixtures' composition and properties, underlining the importance of combined analytical techniques in cosmetic formulation evaluation. Future studies incorporating quantitative evaluation with complementary qualitative observations could provide more nuanced insight into the complex interactions of these mixtures.

Note:For complete dataset interpretation, refer to the raw data files stored in the laboratory information system under Report ID 342.