Lab Report: Analysis of Cosmetic Ingredient Mixtures

Report ID: 1254

Introduction

This lab report summarizes the analysis of various cosmetic ingredient mixtures using a series of sophisticated analytical techniques. We examined mixtures containing combinations of Jojoba Oil, Coconut Oil, Almond Oil with other constituents like Cetyl Alcohol, Beeswax, Glycerin, and Gum. The tests involved included Polymerase Chain Reaction (PCR), High-Performance Liquid Chromatography (HPLC), Ultraviolet-Visible Spectroscopy (UV-Vis), Microplate Reading, viscosity measurement, thermocycling, and pH monitoring. Each mixture was treated as a single test sample.

Materials and Methods

Instrumentation & Conditions:

PCR Machine PCR-96: Conducted to evaluate the propagation cycle threshold of different compositions, primarily focused on Jojoba Oil mixtures.

Microplate Reader MRX: Utilized for optical density (OD) assessments, which are crucial for determining solution concentrations in mixtures with Beeswax and Glycerin.

HPLC System HPLC-9000: Provided quantitative analysis for concentrations of key components, notably in Almond and Coconut Oil mixtures.

UV-Vis Spectrophotometer UV-2600: Performed for the absorbance measurements, offering insights into the purity and concentration levels of Jojoba and Coconut Oil mixtures.

pH Meter PH-700: Determined acidity levels, specifically valuable in assessing mixtures with Almond Oil.

Thermocycler TC-5000: Used to establish the thermal stability, with Coconut Oil mixtures showing significant heat resistance.

Viscometer VS-300: Measured the viscosity of mixtures, which is critical for products' tactile properties.

Observations and Results

Table 1: PCR and Absorbance Results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Instrument** | **Mixture** | **Component 1** | **Component 2** | **Compound 3** | **Measurement** | **Unit** |
| PCR Machine | Jojoba Oil Mix | Jojoba Oil | Cetyl Alcohol | Glycerin | 25.0 | Ct |
| UV-Vis Spectrophotometer | Jojoba Oil Mixture | Jojoba Oil | Cetyl Alcohol | - | 1.8 | Abs |
| PCR Machine | Jojoba Oil Mix | Jojoba Oil | Glycerin | - | 30.0 | Ct |

Note: The mixture of Jojoba Oil and Cetyl Alcohol indicates a reduced cycle threshold, which correlates to higher component availability for detection.

Table 2: Optical Density and pH Values

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Instrument** | **Ingredient Matrix** | **Component 1** | **Component 2** | **Component 3** | **Measure** | **Unit** |
| Microplate Reader | Jojoba Wax Combo | Jojoba Oil | Beeswax | - | 3.2 | OD |
| Microplate Reader | Coconut Solution | Coconut Oil | Glycerin | - | 2.7 | OD |
| pH Meter | Almond Compound | Almond Oil | Gum | - | 6.5 | pH |

Observation: The OD readings display the highest turbidity with Jojoba Oil and Beeswax, suggesting a thicker mixture consistency.

Table 3: HPLC Analysis and Thermal Stability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Device** | **Composition** | **Ingredient 1** | **Ingredient 2** | **Compound 3** | **Concentration** | **Unit** |
| HPLC System | Almond Oil Mix | Almond Oil | Glycerin | - | 560 | mg/L |
| Thermocycler | Coconut Oil & Gum | Coconut Oil | Gum | Glycerin | 78 | C |
| HPLC System | Coconut Concentrate | Coconut Oil | Gum | - | 450 | mg/L |

Analysis: The HPLC results unveiled a substantial concentration of key constituents in Almond Oil mixtures, alongside solid thermal performance metrics for Coconut Oil with added Gum.

Table 4: Viscosity Insights

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Instrument** | **Mixture** | **Oil Base** | **Additive 1** | **Additive 2** | **Viscosity** | **Unit** |
| Viscometer | Jojoba Complex | Jojoba Oil | Beeswax | Glycerin | 2791.32 | cP |
| Viscometer | Coconut Creme | Coconut Oil | Cetyl Alcohol | - | 5192.11 | cP |

Evaluation: Viscosity is highest in Coconut Oil with Cetyl Alcohol, indicative of a robust, creamy texture suitable for skincare applications.

Discussion

The study's results diagnostic of various cosmetic mixtures reveal notable differences in physical and chemical properties. The superior viscosity and thermal resistance of Coconut Oil mixtures confirm their suitability for emollient formulations. The PCR and HPLC analyses suggest active component discernibility in complex matrices, guiding innovations in cosmetic formulation.

Conclusion

Through this elaborate analysis, significant insights into the compatibility and efficacy of various oil-based mixtures and their emulsifiers have been gained. These findings reinforce the potential for tailoring specific formulations in the cosmetic industry to meet diverse consumer requirements. Future investigations should delve into the long-term stability and hydration potential of these mixtures.

Random Information (Irrelevant)

This detailed lab report provides comprehensive data critical to understanding cosmetic formulations, although unrelated details abound, maximizing the complexity of automated data extraction.