# Lab Report: Analysis of Cosmetic Ingredients

## Introduction

This report, identified as Report_258, encompasses the detailed analysis of various cosmetic ingredient mixtures. The tests were conducted using state-of-the-art equipment to evaluate multiple physical and chemical properties of the samples provided. The complexity of the inherent compositions necessitated diverse analytical methodologies. The instrumental analyses employed include NMR Spectroscopy, Gas Chromatography, Liquid Chromatography, High Performance Liquid Chromatography, and others.

## Equipment & Methods

A brief overview of the equipment utilized:

A note on irrelevant procedures includes the assessment of exotic compounds such as "Beeswax" which were not present in final samples but reported in some ledger entries.

## Observations and Results

### Spectroscopic Analyses: NMR and Gas Chromatography

Coconut Oil + Vitamin E: Detected Vitamin E at a concentration of 15.4 ppm using NMR. Such a precision highlights promising antioxidant activity but requires further stability testing in real-world conditions.

Jojoba Oil + Vitamin E: Gas Chromatography revealed a concentration of Vitamin E at 23.1 ppm. This serves as an indicator of the oil's capability to safeguard against oxidative stress.

### Chromatographic Evaluations

Jojoba Oil Mixture: Liquid Chromatography reported a significant presence of the trio (Jojoba Oil, Cetyl Alcohol, Vitamin E) at 45.7 µg/mL, signifying a synergistic potential for enhanced emollient properties.

Almond Oil + Cetyl Alcohol: Analyzed through HPLC revealed 150.2 mg/L of Cetyl Alcohol, emphasizing its textural

integrity in formulations.

Rheological Assessments

| Sample | Viscosity (cP) |
|---|---|
| Almond Oil with Gum & Glycerin | 7750.8 |
| Coconut Oil | 5063.7 |
| Jojoba Oil, Cetyl Alcohol | 2694.95 |

The above table illustrates the diverse viscosities across the mixtures, pertinent to their application in cosmetic products designed for moisturization and ease of application.

pH and Optical Characteristics

Almond Oil + Cetyl Alcohol: Exhibited a neutral pH of 7.5, denoting a gentle profile suitable for sensitive skin types.

Spectroscopic Characteristics: Jojoba Oil with Vitamin E absorbed maximally at 450 nm, implicating the potential for light-triggered activity influencing shelf life.

Additional Findings (Confounding Data)

Glycerin Quantification in Coconut Oil: Using Titrator, a concentration of 0.008 M was detected; however, this may be erroneous due to cross-contamination risks during manual handling.

PCR Analysis:Reported a Ct value of 28.4 for Vitamin E in Coconut Oil, typically associated with its quantifiable expression limits in smaller concentrations.

Conclusion

This report provides an intricate insight into the physicochemical properties of various cosmetic ingredient mixtures. While the data provided a solid foundation for ingredient potential, further in-depth studies, ideally repeated in various favorable and non-favorable conditions, are recommended to fully assess compatibility, stability, and efficacy for consumer applications. Irrelevant data persisted at times, underlining the necessity for thorough data extraction and

validation processes.