

Formulation and Stability Evaluation of Olive Oil-Based Cleansing Oil

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ABSTRACT

Facial cleanser is a cosmetic preparation designed to remove dirt, sebum, and makeup residue from the skin surface without disrupting its physiological balance. Cleansing oil is intended for daily makeup removal, and olive oil is suitable due to its polarity, enabling the “like dissolves like” mechanism to dissolve impurities and excess sebum. The novelty of this study lies in the systematic optimization of decyl glucoside concentration (4–6%) as the primary surfactant in olive oil-based cleansing oil and the use of a modified Nikkol method as a semi-quantitative tool to assess cleansing efficacy, an approach rarely reported in previous literature. This study aimed to develop an olive oil-based cleansing oil with optimal physical stability and cleansing effectiveness. Formulations were prepared using various concentrations of decyl glucoside and evaluated for organoleptic properties, homogeneity, viscosity, pH, stability (cycling test), and cleansing effectiveness using a modified Nikkol method. The optimal results were observed in formulations were F2 (4% decyl glucoside; 292,36 cP; pH 4.9) and F3 (6% decyl glucoside; 367,6; pH 4.93), meeting the SNI 16–4380–1996 requirements. These findings confirm that olive oil can be successfully formulated into a stable and effective cleansing oil using 4–6% decyl glucoside with suitable excipients.

Keywords: cleansing oil; decyl glucoside; facial cleanser; olive oil; surfactant.

INTRODUCTION

Facial skin is a part of the body that requires special care to maintain its health. Disorders of facial skin not only affect health conditions but can also impact appearance and reduce an individual's self-confidence (1). Common facial skin problems include acne, blackheads, excessive oil production, and dull skin. These conditions may result from various reactions triggered by daily routines, such as the use of cosmetics, exposure to sunlight, dust, and pollution from vehicles (2).

Ineffective makeup removal can also trigger several issues, such as clogged pores due to sebum buildup, acne formation, and potential skin irritation (3). Therefore, it is essential to implement hygienic practices, particularly in maintaining facial skin cleanliness, which reflects an individual's awareness and initiative to care for skin health. An example of hygienic behavior in facial skincare includes using appropriate cleansing products (4). Inappropriate cleansing products may cause the skin to become dry and lose its elasticity. Thus, selecting suitable products and cleansing methods is crucial, considering the type of impurities and the user's skin type. Proper cleansing techniques help minimize damage to the skin's protective barrier, which is vital in skincare (5). One of the advancements in the pharmaceutical industry, especially in facial cleansers, is the development of cleansing oils.

Cleansing oil is a facial cleansing product that primarily uses oil as the main ingredient and contains minimal surfactants (6). Surfactants are chemical compounds that reduce surface and interfacial tension, help stabilize dispersed particles, and play a role in controlling the type of formulation produced (7). Surfactants are amphiphilic, meaning they contain both hydrophilic and hydrophobic properties within a single molecule (8).

Based on their origin, surfactants can be synthetic or natural. Examples of natural surfactants include decyl glucoside and cocamidopropyl betaine. Decyl glucoside is a non-ionic surfactant derived from coconut oil, commonly used in personal care products due to its gentle and safe nature for sensitive skin. Meanwhile, cocamidopropyl betaine is an amphoteric surfactant that can alter its charge depending on pH levels. Although its cleansing ability is not particularly strong, cocamidopropyl betaine helps reduce the irritation potential of other surfactants and aids in pH stabilization within the product formulation (9).

Cleansing oil can effectively dissolve makeup and impurities without disrupting the natural oil balance of the skin. The use of natural oils in cleansing oils is preferable over synthetic oils, as natural oils offer more benefits and reduce the risk of allergies and acne. Natural oils are a primary choice in cleansing oil formulations due to their antioxidant properties, safety, and biological compounds such as essential fatty acids and active compounds suitable for the skin, such as olive oil (10).

Olive oil contains a high proportion of monounsaturated fatty acids, particularly oleic acid, which is more resistant to oxidation compared to linoleic and linolenic acids, making it suitable as a stable emollient (11). In addition, the tocopherol and polyphenol content provides antioxidant activity that supports skin barrier protection (12). Olive oil contains several active compounds, such as phenols, tocopherols, sterols, pigments, and squalene (13). Its high vitamin E content helps prevent signs of premature aging, maintain skin moisture, and promote smoother skin texture. Moreover, olive oil aids in the exfoliation of dead skin cells (14). Olive oil is generally stable against oxidation (15).

Compared with previous studies, this research adopts a more targeted formulation strategy. Earlier investigations have developed cleansing oils using various vegetable oils (e.g., castor and avocado oils) and demonstrated good cleansing performance; however, these studies generally varied both the oil type and surfactant systems simultaneously, without focusing on systematic surfactant optimization for a specific oil base (16). Publications involving olive oil have predominantly focused on other skincare preparations, such as facial washes or cleansing balms, or on its antioxidant and moisturizing benefits, rather than on surfactant-optimized olive oil cleansing oil formulations evaluated using standardized stability tests and cleansing performance assays (e.g., modified Nikkol method).

Some formulation studies, such as (9), have examined the effect of decyl glucoside on cleansing-oil stability, yet these works utilized different oil bases, leaving the specific interaction between olive oil and surfactant systems unaddressed. Additionally, the wide variation and modification of the Nikkol cleansing test across studies complicate direct comparison of cleansing performance, and only a limited number of formulations have been assessed for conformity with national cosmetic standards such as SNI 16-4380-1996.

Based on the background above, this study aims to develop a facial cleansing oil formulation using olive oil as the base ingredient. This formulation is expected to exhibit good stability. The success of this research is anticipated to contribute as a new breakthrough in the formulation of cleansing oils with olive oil as the primary cleansing agent.

METHODS

Tool

The equipment used in this study included a chiller, an oven, beakers (Pyrex®), watch glasses (Pyrex®), micropipettes, an analytical balance, oil control films, glass stirrers (Pyrex®), a pH meter, volumetric pipettes (Pyrex®), and a Brookfield viscometer.

Materials

The materials used in this study were distilled water (aquadest), citric acid ($\geq 99\%$ purity, cosmetic grade; Quadrant), cocamidopropyl betaine (30% active surfactant, cosmetic grade; Quadrant), decyl glucoside (50–55% active surfactant, cosmetic grade; Quadrant), buffer solution pH 5.5 (Quadrant), phenoxyethanol (preservative grade; Quadrant), oleum rosae (essential oil grade; Quadrant), olive oil (extra virgin, cold-pressed, imported from Spain; Quadrant), and alpha-tocopherol (vitamin E, $\geq 98\%$ purity, cosmetic grade; Bratachem).

Detailed Procedure

The cleansing oil formulation using olive oil as the base was prepared by weighing all ingredients according to predetermined concentrations, which were selected based on the formulation approach reported by Rachmadani et al. (9) regarding the optimization of decyl glucoside levels in cleansing oil systems. Olive oil, oleum rosae, alpha-tocopherol, and phenoxyethanol were placed into Beaker A and mixed until a homogeneous solution was obtained. Cocamidopropyl betaine, decyl glucoside, and citric acid were added into Beaker B and stirred until fully blended. The mixture from Beaker B was gradually incorporated into Beaker A while maintaining continuous stirring with a homogenizer at 500 rpm to achieve a uniform and well-dispersed emulsion. The final mixture was examined to confirm that all components were well blended, with no clumping or precipitation observed. The resulting cleansing oil was transferred into clean and sterile storage bottles and sealed tightly to prevent contamination (9). The detailed formulation of the cleansing oil is presented in Table 1.

Table 1. Cleansing Oil Formula Based on Olive Oil

Ingredients	Functions	Concentrations (%)				
		F1	F2	F3	F4	F5
Olive oil	Basis	94	92	90	88	86
<i>Decyl glucoside</i>	Surfactant	2	4	6	8	10
<i>Cocamidopropyl betaine</i>	Co-surfactant	2	2	2	2	2
<i>Oleum Rosae</i>	Fragrance	0.2	0.2	0.2	0.2	0.2
Alpha Tocopherol	Antioxidant	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	Preservative	1	1	1	1	1
Citric Acid	pH adjuster	0.5	0.5	0.5	0.5	0.5

Characterization and Stability Testing of the Cleansing Oil Formulation

The physical stability of the cleansing oil formulation was evaluated using the cycling test method, in which the product was stored at 4 °C in a refrigerator for 24 hours and then transferred to an oven at 40 °C for another 24 hours, constituting one cycle. After each cycle, the sample was subjected to organoleptic evaluation, viscosity measurement, pH test, homogeneity test, and cleansing efficacy assessment. A total of six cycles was performed. The selection of six cycles was based on previous reports indicating that 5–6 cycles are sufficient to simulate accelerated storage and to detect early instability in cleansing oil formulations without inducing excessive stress beyond typical formulation limits (9,17).

Organoleptic Test

The organoleptic test is a method used to assess the quality of a product based on the response of the human senses. Observations in this test include the evaluation of odor, color, and texture of each formulation. These parameters are examined to detect any undesirable changes that may occur during storage or due to formulation instability (9).

Homogeneity Test

The homogeneity test was performed using two microscope slides. A small amount of the sample was placed on the first slide, evenly spread, and then covered with the second slide. The formulation was considered homogeneous if it exhibited a uniform texture with no visible clumps or particle aggregation (9).

Viscosity Test

Viscosity was measured using a Brookfield viscometer equipped with spindle number 2 at a rotation speed of 30 rpm. A 50 mL sample of the cleansing oil was transferred into a beaker, and the spindle was then immersed into the formulation. The sample volume of 50 mL was selected to ensure optimal submersion of the spindle and to prevent air bubble entrapment during viscosity measurement, as recommended in laboratory-scale cosmetic rheology studies. Insufficient sample volume may lead to inaccurate viscosity readings due to incomplete spindle immersion and surface disturbance. Once the device was turned on, the viscosity reading was recorded (18). The recommended viscosity range for a well-formulated cleansing oil is between 100–600 cPs to ensure optimal spreadability and user comfort.

pH Test

The pH of the formulation was measured using a calibrated pH meter. Prior to measurement, the pH meter was calibrated using a pH 7.0 buffer solution and rinsed with distilled water (aquadest). The electrode was then immersed into the cleansing oil formulation and allowed to stabilize for a few moments until the pH reading appeared on the display screen. The acceptable pH range for facial skin products is between 4.5 and 6.5, to ensure skin compatibility and minimize the risk of irritation (9).

Cleansing Ability Test

This test was conducted both before and after the stability test. The cleansing performance was evaluated using a modified Nikkol method. The modification of the Nikkol method in this study was applied to the use of oil control film as an indicator to verify that all makeup had been thoroughly removed without leaving any oil residue on the test surface. A Petri dish was used to hold a test surface area of $2 \times 2 \text{ cm}^2$, which was applied with lipstick, and another area of $4 \times 3 \text{ cm}^2$, applied with foundation, and allowed to sit for 5 minutes. Subsequently, 0.5 mL of olive oil-based cleansing oil was applied to the lipstick area, and 1 mL to the foundation area. The lipstick area was gently massaged 10 times, while the foundation area received 25 massage strokes. Afterward, 5 mL of water was added to each area and gently massaged 25 times. The Petri dishes were then immersed in water 3 times, each for 1 minute, and immediately removed. The presence of residual oil was checked using oil control film. A change in color on the oil control film indicated that residual oil remained on the Petri dish. The criteria for effective cleansing were defined as the complete removal of makeup and no residual oil left on the surface after rinsing (10).

RESULT AND DISCUSSION

Cleansing Oil Formulation

Olive oil was selected as the primary ingredient in the cleansing oil formulation due to its effective ability to dissolve impurities, sebum, and oil-based makeup. However, the addition of surfactants is necessary to ensure

that no oily residue remains after rinsing, which could otherwise clog pores and lead to new skin issues. The main component of olive oil, oleic acid, aids in cleansing the skin without stripping away its natural moisture. Additionally, olive oil functions as an emollient, helping to retain skin hydration and reinforce the skin barrier, making it suitable for various skin types, including sensitive skin. From a stability perspective, olive oil possesses good oxidative resistance, which prevents rancidity and helps extend the product's shelf life.

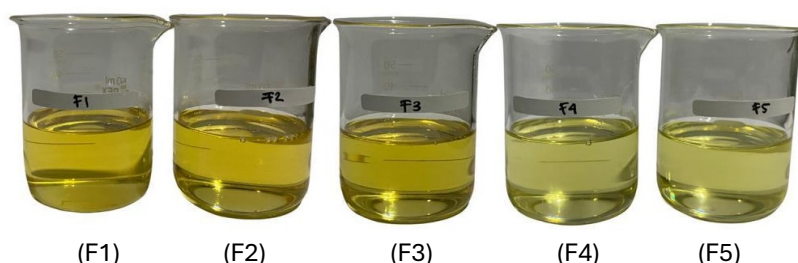


Figure 1. Cleansing Oil Containing Olive Oil (F1: 94% Olive Oil, F2: 92% Olive Oil, F3: 90% Olive Oil, F4: 88% Olive Oil, F5: 86% Olive Oil)

The components of the cleansing oil include decyl glucoside, a non-ionic surfactant derived from coconut oil, which is commonly used in various personal care products and is considered safe for sensitive skin. Cocamidopropyl betaine is an amphoteric surfactant (a surfactant that can change its charge depending on the pH of the environment). While cocamidopropyl betaine is not highly effective as a standalone cleansing agent, when used in combination with other surfactants, it can enhance conditioning effects, reduce the irritation potential of other surfactants, and help balance the pH (9). Phenoxyethanol is used as a preservative in a wide range of rinse-off and leave-on cosmetic products (19). Citric acid is widely used in pharmaceutical formulations, particularly as a pH-adjusting agent. Alpha-tocopherol functions as an antioxidant in oil-based pharmaceutical products (20). Oleum rosae is added to mask the inherent odor of the formulation, contributing to a more pleasant user experience. These ingredients were combined and formulated into a cleansing oil preparation.

The adjustment of the formula composition aims to optimize cleansing efficacy, ensuring that the oil and surfactant components are capable of effectively dissolving cosmetic residues and impurities. An appropriate surfactant facilitates the rinsing process without leaving residues on the skin. In addition, ingredient selection also considers product safety and quality aspects, such as the inclusion of antioxidants to prevent oil oxidation and the use of ingredients that comply with cosmetic standards.

The combination of olive oil and decyl glucoside in the cleansing oil formula demonstrated good performance in both stability and cleansing ability tests. The appropriate ratio of these two ingredients plays a critical role in ensuring the physical stability of the formulation. Stability testing helps verify the product's quality, efficacy, and safety over its shelf life or usage period. Furthermore, this combination influences the cleansing effectiveness, as the correct proportion of olive oil and decyl glucoside ensures optimal cleansing performance without leaving oily residues on the skin.

Characterization and Stability Testing of the Cleansing Oil Formulation

The cleansing oil formulation was evaluated through a series of characterization and stability tests to ensure product quality, safety, and performance throughout its shelf life. The characterization tests included

organoleptic evaluation, pH measurement, viscosity test, homogeneity assessment, and cleansing efficacy test. These tests were designed to examine the physical attributes, skin compatibility, and functional performance of the formulation. Stability testing was conducted using the cycling test method, which involved alternating storage of the samples at 4°C and 40°C for 24 hours each, repeated over six cycles. The purpose of this test was to simulate extreme temperature conditions that may occur during product distribution and storage. After the cycling test, the formulation was re-evaluated to detect any changes in physical properties such as color, odor, texture, pH, viscosity, and cleansing performance. A stable formulation is indicated by the absence of significant changes in these parameters. Product stability is a critical aspect in cosmetic formulation. A formulation is considered stable if it remains within acceptable limits throughout its shelf life and usage period. Indicators of product stability include the absence of phase separation, no sediment formation, and no signs of cracking or creaming (9).

Organoleptic Test

The organoleptic test included the evaluation of odor, color, and texture of the formulation through visual observation (21). Organoleptic testing plays an important role in assessing the quality of a product. The results of the organoleptic evaluation are presented in Table 2.

Table 2. Results of Organoleptic Evaluation of Cleansing Oil Formulations

Formula	Organoleptic Test	
	Before	After
F1	Bright yellow, characteristic odor, viscous	Bright yellow, characteristic odor, viscous
F2	Bright yellow, characteristic odor, viscous	Bright yellow, characteristic odor, viscous
F3	Bright yellow, characteristic odor, viscous	Bright yellow, characteristic odor, viscous
F4	Light yellow, characteristic odor, viscous	Light yellow, characteristic odor, viscous
F5	Light yellow, characteristic odor, viscous	Light yellow, characteristic odor, viscous

Based on the results of the evaluation before and after the cycling test, formulation F1 exhibited a bright yellow color, characteristic odor, and a viscous texture. F2 had a similar bright yellow color and odor but showed a slightly more viscous texture than F1. F3 also maintained a bright yellow color and characteristic odor, with greater viscosity than F2. F4 displayed a bright yellow color, characteristic odor, and a more viscous texture than F3. Meanwhile, F5 exhibited a light yellow color, characteristic odor, and was the most viscous among all formulations.

The variation in viscosity among the formulations is attributed to the differences in decyl glucoside concentration. As the concentration of decyl glucoside increased, the viscosity of the formulation also increased. This is due to stronger interactions between surfactant molecules, forming a more complex structure that enhances the thickness of the cleansing oil. In addition, there was a visible difference in color between F1–F3 and F4–F5, which can be attributed to the varying concentrations of olive oil and decyl glucoside used. A lower concentration of olive oil and higher concentration of decyl glucoside resulted in a reduction in yellow intensity, making the formulation appear lighter in color (9).

Homogeneity Test

The homogeneity test aims to ensure that the active ingredient and other components in the formulation are evenly distributed (22). The results of the homogeneity test are presented in Table 3.

Table 3. Results of the Homogeneity Test of Cleansing Oil Formulations

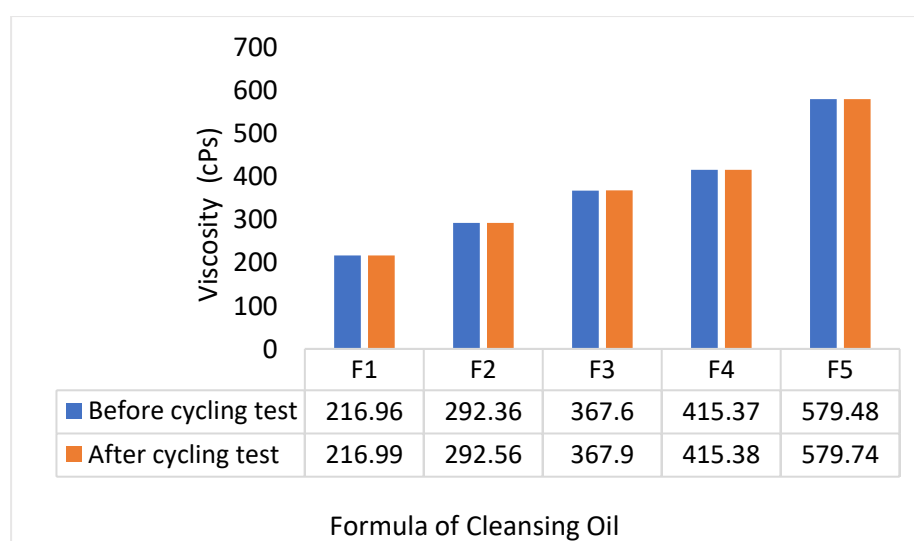
Formula	Homogeneity	
	Before	After
F1	Homogen	Homogen
F2	Homogen	Homogen
F3	Homogen	Homogen
F4	Phase separation	Phase separation
F5	Phase separation	Phase separation

Based on the results of the homogeneity test before and after the cycling test, formulations F1, F2, and F3 were found to be homogeneous, as indicated by uniform color distribution and the absence of undissolved particles or clumps on the microscope slide. In contrast, formulations F4 and F5 showed signs of sedimentation both before and after the cycling test.

According to Dibofori-Orji, the amount of surfactant plays a critical role in the stability of a formulation. An insufficient amount may result in an unstable emulsion, while excessive amounts may lead to issues such as sediment formation. This occurs because high concentrations of decyl glucoside can create a significant difference in specific gravity between the oil and aqueous phases. Decyl glucoside has a higher density compared to olive oil, leading to density imbalance within the formulation. As a result, the phase with a higher specific gravity tends to settle at the bottom, while the lighter phase, such as olive oil, rises to the top. This imbalance, coupled with possible emulsifier degradation due to cycling test conditions, further accelerates phase separation in the cleansing oil formulations. Therefore, phase separation was observed in the formulations containing 8% and 10% decyl glucoside (9).

Viscosity Test

The viscosity test aims to determine the thickness of the resulting formulation. The higher the viscosity value, the thicker the formulation (23). The viscosity values, measured in cP (centipoise), are presented in Figure 2.

**Figure 2. Viscosity Test Results of Cleansing Oil Formulations**

Based on the test results obtained using a Brookfield viscometer, the viscosity values before and after the cycling test were within the ideal range of 100–600 cPs, although slight changes in viscosity were observed after

the cycling test. The results showed differences in viscosity among formulations, where F1 had the lowest viscosity and F5 the highest. This variation is attributed to the differences in decyl glucoside concentration. The higher the concentration of decyl glucoside, the higher the viscosity of the formulation (9). Changes in viscosity values may be influenced by several factors, including the mixing process, blending techniques, and the concentration of ingredients or emulsifiers. A higher emulsifier concentration leads to increased viscosity due to the formation of more micelles or emulsion structures, which slows down fluid movement and increases thickness (24).

pH Test

pH testing was conducted to ensure that the formulation's pH is appropriate for human skin acidity (25). The normal pH range of human skin is between 4.5 and 6.5 (26). A formulation with a pH that is too acidic may cause skin irritation, while an excessively alkaline pH can lead to dryness and flaking of the skin (27). The pH test results of the cleansing oil formulations are presented in Figure 3.

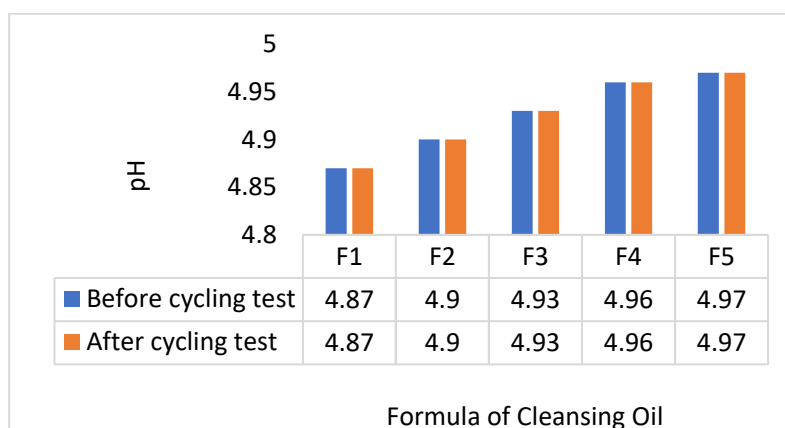


Figure 3. pH Test Results of Cleansing Oil Formulations

The pH test results, both before and after the cycling test, showed a slight increase in pH values across all formulations, although the changes were relatively minor. This increase in pH is associated with the rising concentration of decyl glucoside in each formulation. Decyl glucoside has an inherently alkaline pH, ranging from 11.5 to 12.5; therefore, the higher its concentration, the more it influences the final pH of the formulation. Despite these changes, all formulations remained within the acceptable skin pH range of 4.5–6.5. This indicates that the developed cleansing oil formulations can be considered safe for use on the skin.

Cleansing Efficacy Test

The cleansing efficacy test aims to evaluate the ability of the formulation to remove dirt and waterproof cosmetic residues from the skin surface (28). The results of the cleansing efficacy test for the cleansing oil formulations are presented in Table 4.

Table 4. Results of the Cleansing Efficacy Test of Cleansing Oil Formulations

Formula	Cleansing Efficacy Test	
	Before	After
F1	Able to remove makeup, leaves an oily residue	Able to remove makeup, leaves an oily residue
F2	Able to remove makeup, leaves no oily residue	Able to remove makeup, leaves no oily residue

F3	Able to remove makeup, leaves no oily residue	Able to remove makeup, leaves no oily residue
F4	Able to remove makeup, leaves no oily residue	Able to remove makeup, leaves no oily residue
F5	Able to remove makeup, leaves no oily residue	Able to remove makeup, leaves no oily residue

This cleansing efficacy test was performed before and after the stability test. A formulation is considered to have good cleansing ability if it can effectively remove waterproof makeup, specifically foundation and lipstick, without leaving an oily sensation. This is often assessed using the modified Nikkol method, in which a test product is applied to an area coated with oil control film or makeup, then rinsed. The evaluation is qualitative, based on visual observation of color change or residual film: a lack of color change indicates effective cleansing. The results showed that the F1 cleansing oil was able to remove waterproof makeup; however, it still left an oily residue after rinsing, as indicated by the partial color change observed on the oil control film. Meanwhile, F2, F3, F4, and F5 successfully removed makeup without leaving any oily sensation, as shown by the absence of color change on the oil control film after use.

In cleansing oil formulations, the ratio between oil and surfactant plays a crucial role in cleansing performance and rinseability. F1, which contained 94% olive oil and only 2% decyl glucoside, did not provide sufficient surfactant to emulsify the oil phase completely, resulting in residual oil after rinsing. In contrast, F2 through F5 with higher surfactant concentrations showed better cleansing performance due to enhanced micelle formation, allowing the oil phase to disperse more readily in water during rinsing.

A cross-analysis of related parameters further explains this phenomenon. Increasing the surfactant concentration not only improved emulsification but also reduced viscosity, which facilitated faster dispersion of the oil phase during washing. At the same time, the increase in surfactant content slightly lowered the pH of the formulations, but still remained within an acceptable skin-compatible range, supporting comfortable and residue-free cleansing. This combination of adequate surfactant concentration, moderate viscosity, and acceptable pH contributed to superior cleansing performance in F2–F5. Among these, F2 and F3 showed the best balance of viscosity, pH, and cleansing efficacy, and therefore were identified as formulations meeting the optimal standard.

These findings are in line with previous studies showing that the concentration of surfactant significantly affects both cleansing efficacy and rinse-off performance of cleansing oils. For example, in a study of cleansing-oil formulations based on castor oil (*Ricinus communis*) with varying concentrations of non-ionic surfactant (Decyl glucoside), it was found that increasing the surfactant led to improved cleaning efficiency and acceptable stability of the product (9).

Similarly, a recent development of a cleansing oil based on avocado seed oil reported that the surfactant plays an essential role in enabling the oil-based cleanser to solubilize hydrophobic makeup and allow efficient removal without excessive residual film (29). From a mechanistic perspective, the role of surfactants in dissolving hydrophobic materials into the aqueous phase is well established: the amphiphilic structure of surfactant molecules lowers the interfacial tension between oil and water, allowing micelle formation and facilitating removal upon rinsing (30).

Formulations F2 and F3 are considered optimal because they combine favorable physical properties with effective cleansing performance. Numerically, both exhibited viscosities suitable for easy application and skin-

compatible pH values (around 5–6), while stability assessments confirmed homogeneity and the absence of phase separation. Functionally, qualitative tests using the modified Nikkol method showed that both formulations effectively removed waterproof makeup without leaving an oily residue. Thus, the optimality of F2 and F3 is based on the integration of objective measurements and functional performance.

CONCLUSION

Based on the results of this study, the most optimal formulations of olive-oil-based cleansing oil are F2 (92% olive oil and 4% decyl glucoside) and F3 (90% olive oil and 6% decyl glucoside). Both demonstrated good physical stability and effectively removed waterproof makeup without leaving oily residue after rinsing. This study also highlights the importance of optimizing the oil–surfactant ratio in cleansing oil systems. The findings show that decyl glucoside at 4–6% provides the most balanced performance in terms of stability, cleansing efficacy, and skin-compatible pH. The identification of this optimal surfactant range, along with validation according to SNI cosmetic standards, represents the key contribution and practical significance of this research. Future studies are recommended to assess long-term stability under accelerated storage, evaluate skin compatibility through in vivo testing, and explore the incorporation of additional actives or alternative botanical oils to further improve cleansing performance and sustainability.

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