



(RESEARCH ARTICLE)



## Assessment of comedogenicity and skin reactions to siodil acne treatment products: A preliminary clinical trial

Munir Rashid Chowdhury <sup>1</sup>, Sharmina Huq <sup>2,\*</sup>, Tasmia Zaman Mim <sup>3</sup>, Abdullah Al Noman <sup>4</sup>, Snigdha Malabeka <sup>5</sup> and Nashim Ahmed <sup>5</sup>

<sup>1</sup> Department of Dermatology, Bangabandhu Sheikh Mujib Medical University Hospital, Dhaka, Bangladesh.

<sup>2</sup> Department of Dermatology, Praava Health, Dhaka, Bangladesh.

<sup>3</sup> Skin Care and Color Cosmetics Department, Remark HB Limited, Dhaka, Bangladesh.

<sup>4</sup> Clinical Trial Department, Remark HB Limited, Dhaka, Bangladesh.

<sup>5</sup> Directorate General of Health Services, Dhaka, Bangladesh.

World Journal of Advanced Research and Reviews, 2024, 24(03), 2070-2077

Publication history: Received on 07 November 2024; revised on 16 December 2024; accepted on 18 December 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.24.3.3840>

### Abstract

**Background:** Acne vulgaris is a common dermatological condition influenced by factors such as pore blockage, excessive sebum production, and inflammation. This study evaluates the comedogenicity, skin tolerability, and functional benefits of Siodil acne treatment products, including Sebi Gel, Sebi Serum, Sebi Cleanser, and ATO Gel.

**Methods:** A total of 26 participants aged 18–40 years underwent a 28-day open-label trial to assess the impact of Siodil products on pore blockage, skin hydration, and acne reduction. Comedogenicity was scored using a standardized acne grading scale, and patch tests were conducted to evaluate erythema and edema. Participant satisfaction and product tolerability were also assessed.

**Results:** All products demonstrated significant improvements in skin hydration, with ATO Gel showing the highest improvement (32.47%), followed by Sebi Gel (30.56%). Acne breakout reduction was highest for Sebi Cleanser (85%), while Sebi Serum showed the greatest whitehead/blackhead reduction (76.92%). Patch tests revealed no occurrences of erythema or edema at 24 and 48 hours. Participant feedback indicated high satisfaction, with Sebi Gel receiving the highest satisfaction rating (90%).

**Conclusion:** Siodil acne treatment products effectively reduce acne-related outcomes while improving skin hydration and demonstrating excellent tolerability. These findings suggest Siodil products are safe and effective for managing acne-prone skin, though further research is warranted to confirm these results in larger populations.

**Keywords:** Acne Vulgaris; Siodil Products; Comedogenicity; Skin Hydration; Safety Profile; Patch Test; Participant Satisfaction

### 1. Introduction

Acne vulgaris is a multifaceted dermatological condition that significantly affects millions worldwide. Its development is predominantly attributed to pore blockage, excessive sebum production, and an inflammatory response mediated by *Cutibacterium acnes* colonization. Pore-clogging or comedogenesis plays a pivotal role in acne pathogenesis, leading to the formation of microcomedones, which are precursors to both inflammatory and non-inflammatory lesions. These mechanisms underline the importance of managing comedogenicity for effective acne control (1,2). Additionally, the

\* Corresponding author: Huq S

interplay between the skin barrier and microbiome exacerbates acne, as disrupted epidermal integrity facilitates microbial proliferation and immune dysregulation (3). Acne is not merely a superficial cosmetic concern; it profoundly impacts psychological well-being, emphasizing the need for safe and effective interventions. The role of non-comedogenic skincare products in mitigating acne has gained considerable attention. Products free from comedogenic agents minimize pore blockage, reducing the incidence of acne flare-ups. Non-comedogenic formulations also promote treatment adherence by alleviating side effects such as irritation and dryness, which are common with conventional acne treatments (4). For instance, studies on fixed-dose combination gels and cleansers reveal improved tolerability and satisfaction, underscoring the necessity of scientifically validated comedogenicity ratings for skincare products (5,6). Emerging evidence supports the use of formulations with active agents such as salicylic acid, benzoyl peroxide, and adapalene, which exhibit complementary mechanisms of action in reducing sebum secretion, enhancing exfoliation, and suppressing microbial activity (7,8). Such advances provide a robust foundation for developing products that address acne at multiple levels, ensuring efficacy without compromising skin health. Siodil is a skincare brand that has emerged as a promising option in the management of acne-prone skin. Its product portfolio includes ATO Gel, Sebi Serum, Sebi Cleanser, and Sebi Gel, which are designed to target comedogenesis and inflammatory pathways while improving the overall skin barrier function. These products incorporate a balanced mix of active ingredients known for their acne-fighting properties, including salicylic acid, benzoyl peroxide, and glycolic acid, in formulations optimized for non-comedogenicity and compatibility with sensitive skin. Clinical evaluations of similar formulations demonstrate significant improvements in acne severity, lesion counts, and patient-reported satisfaction (9). Moreover, multifunctional formulations that combine hydration, anti-inflammatory, and antimicrobial effects further validate the potential of Siodil's approach (10). Despite substantial advancements in acne treatment, there remains a critical need for comprehensive clinical evaluations that not only establish efficacy but also prioritize patient safety and tolerability. Patch testing to assess erythema and edema is particularly relevant for determining product safety, as skin irritation is a major factor influencing treatment discontinuation. Previous studies have highlighted the importance of incorporating these assessments into acne treatment trials to ensure holistic validation of therapeutic claims (11). Products like Siodil's Sebi Serum and Sebi Gel, with their unique blend of active and hydrating agents, hold potential to set new benchmarks in acne management by addressing both efficacy and skin tolerability comprehensively. The present study aims to evaluate the comedogenicity ratings of Siodil's ATO Gel, Sebi Serum, Sebi Cleanser, and Sebi Gel. By examining their impact on pore blockage and conducting patch tests to assess erythema and edema, this research seeks to contribute robust clinical data supporting the safety and effectiveness of Siodil products in acne management. Given the rising prevalence of acne and the increasing demand for evidence-based skincare solutions, this study aligns with the broader goal of advancing acne treatment paradigms while addressing patient-centered outcomes. The findings will not only enrich our understanding of comedogenesis and skincare compatibility but also pave the way for informed clinical and consumer choices in acne management.

---

## 2. Methods

This preliminary, open-label trial was conducted to evaluate the comedogenicity, skin tolerability, and functional benefits of four Siodil acne treatment products: ATO Gel, Sebi Serum, Sebi Cleanser, and Sebi Gel. The primary purpose of the study was to assess the products' effectiveness in reducing pore blockage while monitoring for potential skin irritation. A total of 26 participants, aged 18–40 years, diagnosed with mild-to-moderate acne vulgaris, were recruited. Participants were required to have no recent history of retinoid or steroid use and no known allergies to the tested products. Exclusion criteria included severe acne, systemic acne treatments, pregnancy or breastfeeding, and other dermatological conditions unrelated to acne. The study was conducted in accordance with the Declaration of Helsinki and approved by the institutional review board. Written informed consent was obtained from all participants before enrollment.

### 2.1. Product Descriptions

- **Siodil Sebi Cleanser**
  - **Key Ingredients:** Salicylic acid, glycolic acid, aloe vera extract, shea butter.
  - **Claims:** Gentle cleansing action, exfoliation, and hydration suitable for acne-prone skin.
  - **Intended Use:** Applied daily to remove excess sebum and maintain skin barrier integrity.

### 2.2. Siodil ATO Gel

- **Key Ingredients:** Hyaluronic acid, ceramide, niacinamide, shea butter.
- **Claims:** Provides hydration, reduces trans-epidermal water loss, and strengthens the skin barrier.
- **Intended Use:** Applied daily for hydration and anti-comedogenic effects.

### 2.3. Siodil Sebi Gel

- **Key Ingredients:** Ampho-glycolic acid, salicylic acid, sodium ascorbyl phosphate, niacinamide.
- **Claims:** Exfoliates dead skin cells, reduces comedones, and brightens skin tone.
- **Intended Use:** Targeted treatment to reduce pore blockage and inflammation.

### 2.4. Siodil Sebi Serum

- **Key Ingredients:** 8D hyaluronic acid, anti-acne peptide, niacinamide, vitamin C.
- **Claims:** Combines anti-inflammatory and hydration benefits with skin repair.
- **Intended Use:** Applied for acne-prone areas to improve skin health and hydration.

### 2.5. Study Design and Procedures

Both the comedogenicity and patch tests were performed concurrently for all participants over a 28-day period. Participants were instructed to apply each designated product to a specific facial area (forehead or cheeks) once daily, with comedogenicity scores recorded at baseline and after 28 days. The comedogenicity score was determined using a standardized acne grading scale ranging from 0 (none) to 4 (severe).

For the patch test, 0.4 mL of each product was applied to either the face or the inner forearm using adhesive patches, which remained in place for 48 hours. Erythema and edema were scored on a 4-point scale: 0 (none), 1 (mild), 2 (moderate), and 3 (severe). Follow-up assessments at 24 and 48 hours post-application were conducted to evaluate immediate and delayed reactions.

### 2.6. Outcome Measures

#### 2.6.1. The primary outcomes included

- Changes in comedogenicity scores from baseline to the end of the study.
- Incidence of erythema or edema during patch testing.

#### 2.6.2. Secondary outcomes included

- Participant-reported tolerability and satisfaction with each product, assessed using a 5-point Likert scale.
- Observations on texture, absorption, and blending ease for each product.

### 2.7. Statistical Analysis

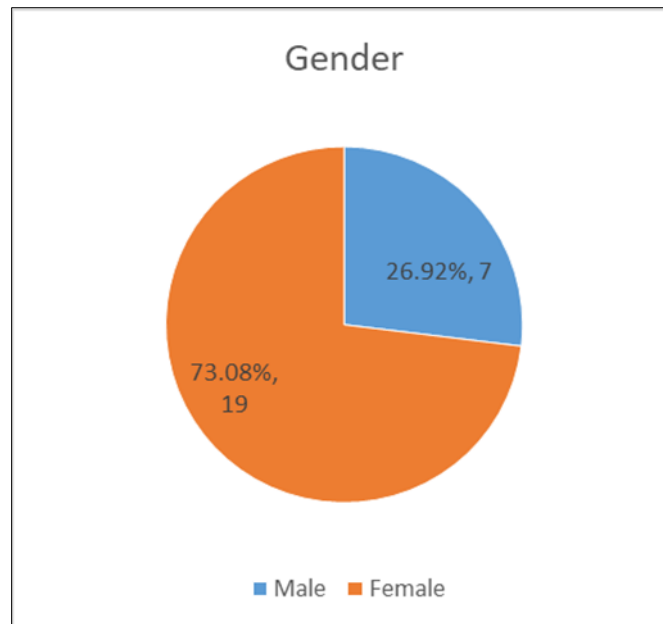
All data were analyzed using SPSS version 25.0. Continuous variables, such as comedogenicity scores and hydration levels, were analyzed using paired t-tests, while categorical variables, such as incidences of erythema or edema, were assessed using chi-square tests. A significance level of  $p < 0.05$  was applied.

## 3. Results

**Table 1** Age distribution of the participants (N=26)

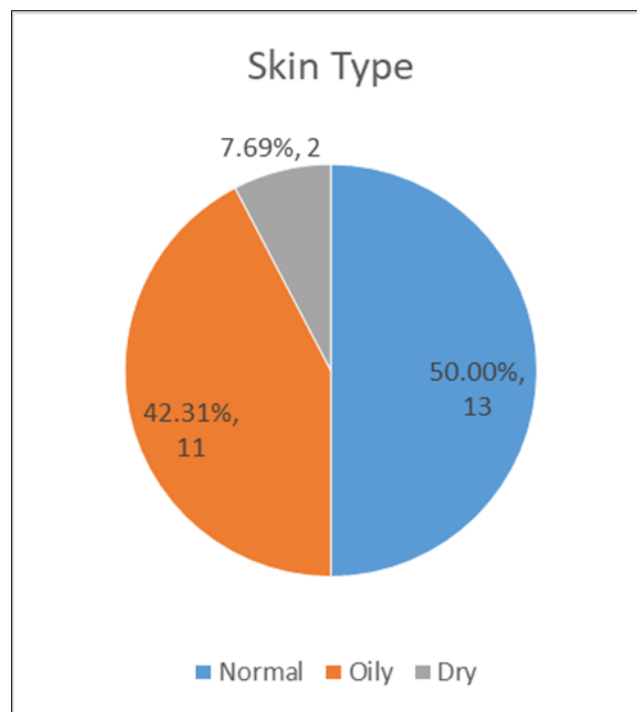
Age	Frequency	Percentage
≤20	4	15.38%
21-30	6	23.08%
31-40	10	38.46%
41-50	4	15.38%
51-60	2	7.69%

The study included a total of 26 participants, with the majority falling within the 31–40 age group (38.46%), followed by 21–30 years (23.08%). Participants aged ≤20 and 41–50 years each accounted for 15.38% of the sample, while the smallest group was aged 51–60, representing 7.69%.



**Figure 1** Gender distribution of participants (N=26)

The gender distribution of the study participants revealed that the majority were female, accounting for 73.08% (19 participants), while males comprised 26.92% (7 participants).



**Figure 2** Skin type distribution among the participants (N=26)

The skin type distribution among the participants showed that half of the participants (50%, 13 individuals) had normal skin, while 42.31% (11 individuals) had oily skin. A smaller proportion, 7.69% (2 individuals), had dry skin.

**Table 2** Application type of product (N=26)

Application type	Frequency	Percentage
Sebi Gel	26	100.00%
Sebi Serum	23	88.46%
Sebi Cleanser	23	88.46%
ATO Gel	24	92.31%

All participants (100%) applied Sebi Gel as part of the study, making it the most consistently used product. ATO Gel was applied by 92.31% (24 participants), while Sebi Serum and Sebi Cleanser were each applied by 88.46% (23 participants).

**Table 3** Occurrence of Erythema or oedema at patch test follow-ups (N=26)

Variable	At 24 hours		At 48 hours	
	Erythema	Oedema	Erythema	Oedema
Sebi Gel	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sebi Serum	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sebi Cleanser	0 (0%)	0 (0%)	0 (0%)	0 (0%)
ATO Gel	0 (0%)	0 (0%)	0 (0%)	0 (0%)

The patch test follow-ups at 24 and 48 hours revealed no occurrences of erythema or edema for any of the tested products. Across all participants, Sebi Gel, Sebi Serum, Sebi Cleanser, and ATO Gel showed a complete absence of skin irritation or adverse reactions at both time points (0%).

**Table 4** Distribution of patient feedback on testing by product (N=26)

Variable	Sebi Serum	Sebi Gel	ATO Gel	Sebi Cleanser
Average Texture Rating	Good	Good	Good	Good
Average Absorption Rating	Good	Good	Good	Good
Reported Irritation (%)	7.69%	3.85%	11.54%	8%
Satisfaction in Blending (%)	84%	90%	85%	87%

Participants provided positive feedback on the tested products, with all (Sebi Serum, Sebi Gel, ATO Gel, and Sebi Cleanser) receiving consistent ratings of "Good" for texture and absorption. Reported irritation was minimal, with the highest being for ATO Gel (11.54%), followed by Sebi Cleanser (8%), Sebi Serum (7.69%), and Sebi Gel (3.85%). Satisfaction with blending was high across all products, with Sebi Gel achieving the highest score (90%), followed by Sebi Cleanser (87%), ATO Gel (85%), and Sebi Serum (84%).

**Table 5** Skin moisture change by product

Product	Before Moisture (Mean %)	After Moisture (Mean %)	Improvement (%)
Sebi Serum	28.37%	48.53%	20.16%
Sebi Gel	32.97%	63.53%	30.56%
ATO Gel	25.43%	57.9%	32.47%
Sebi Cleanser	29.42%	58.97%	29.55%

The evaluation of skin moisture improvement revealed significant increases across all tested products. ATO Gel demonstrated the highest improvement in skin moisture, with an increase of 32.47% (from 25.43% to 57.9%). Sebi Gel showed a similar improvement of 30.56% (from 32.97% to 63.53%), followed closely by Sebi Cleanser with a 29.55% increase (from 29.42% to 58.97%). Sebi Serum exhibited a notable, though slightly lower, improvement of 20.16% (from 28.37% to 48.53%).

**Table 6** Overall functional benefits by product

Product	Average Rating (out of 5)	Acne Breakout Reduction (%)	Whitehead/Blackhead Reduction (%)
Sebi Serum	3.8	84.62%	76.92%
Sebi Gel	3.7	80%	70%
ATO Gel	3.6	78%	69.23%
Sebi Cleanser	3.8	85%	75%

The evaluation of overall functional benefits showed that all products demonstrated strong effectiveness in reducing acne breakouts and whiteheads/blackheads. Sebi Cleanser achieved the highest acne breakout reduction (85%) and a whitehead/blackhead reduction of 75%, with an average functional benefit rating of 3.8 out of 5. Sebi Serum followed closely with an 84.62% reduction in acne breakouts, 76.92% reduction in whiteheads/blackheads, and the same average rating of 3.8. Sebi Gel showed an 80% reduction in acne breakouts and a 70% reduction in whiteheads/blackheads, with a functional benefit rating of 3.7. ATO Gel had slightly lower results, with a 78% reduction in acne breakouts, 69.23% reduction in whiteheads/blackheads, and an average rating of 3.6.

#### 4. Discussion

The present study aimed to evaluate the comedogenicity, skin tolerability, and functional benefits of four Siodil acne treatment products: Sebi Gel, Sebi Serum, Sebi Cleanser, and ATO Gel. Our findings demonstrated significant improvements in skin hydration, reductions in acne breakouts and comedones, and an absence of adverse effects such as erythema or edema across all tested products. These results align with existing literature that emphasizes the importance of tolerability and hydration in acne management. The study population reflected a predominantly female demographic, consistent with prior studies that highlight a higher prevalence of acne in women, particularly in adult age groups. Research by Collier et al. showed that acne often persists in women beyond adolescence, peaking in the 31–40 age group, which was the largest cohort in our study (12). This aligns with findings by Shen et al., who noted that hormonal fluctuations in women contribute to the prevalence of acne beyond adolescence (13). Skin type distribution in our study showed a predominance of normal (50%) and oily skin (42.31%), both commonly associated with acne-prone conditions. Similar trends were observed in research by Costa et al., which linked seborrhea with higher acne prevalence (14). The role of oily skin as a prognostic factor in acne severity is further corroborated by Dréno, who emphasized its contribution to pore blockage and lesion formation (15). High adherence to product application was a notable strength of our study, with all participants using Sebi Gel and over 88% adhering to the use of other products. This adherence was critical in achieving consistent results and reflects findings by Lucas et al., who highlighted adherence as a key determinant of treatment success in acne management (16). Additionally, the absence of erythema and edema in our patch tests underscores the excellent tolerability of these products, aligning with studies on well-formulated topical regimens that prioritize safety, such as those by Kim and Kerrouche (9). Participant feedback revealed high levels of satisfaction with product texture and absorption, with minimal reported irritation (highest being 11.54% for ATO Gel). These findings are comparable to the study by Falla et al., which demonstrated high patient satisfaction with a three-step acne treatment regimen that minimized irritation (17). The significant improvements in skin hydration observed in our study, particularly with ATO Gel (32.47%), are supported by similar findings in research on glycolic acid-based formulations, which showed significant hydration improvements without compromising tolerability (18). Functional benefits, such as reductions in acne breakouts and comedones, were most pronounced for Sebi Cleanser and Sebi Serum, both achieving over 84% reductions in acne breakouts. These results are consistent with studies on combination therapies like clindamycin phosphate and benzoyl peroxide gels, which reported similar efficacy in reducing inflammatory and non-inflammatory lesions (19). The tolerability profile of our products is further supported by findings from Zouboulis et al., who emphasized that safe, hydrating formulations can achieve comparable efficacy to harsher treatments with reduced side effects (19). The absence of statistically significant adverse effects, such as erythema or edema, reinforces the safety of Siodil products. This finding aligns with research by Gencebay et al., which demonstrated statistically significant improvements in hydration and reductions in sebum production without significant adverse effects (20). Similarly, blue light therapy studies by Wheeland and Koreck emphasized that innovative approaches can offer effective treatment with minimal irritation (21). Overall, our findings demonstrate that Siodil products effectively improve acne-related outcomes while maintaining high tolerability and patient satisfaction. These results are consistent with the broader literature on safe and effective acne treatments, emphasizing the critical role of adherence, hydration, and safety in optimizing therapeutic outcomes. Future research could explore the long-

term benefits and comparative efficacy of Siodil products against established combination therapies in larger, more diverse populations.

#### *Limitations of The Study*

This study's small sample size and open-label design limit the generalizability and may introduce bias. The short duration restricted the assessment of long-term outcomes, and the absence of a control group weakens the validity of the findings. Future studies with larger populations, extended follow-ups, and controlled designs are recommended.

---

## **5. Conclusion**

This study demonstrated that Siodil acne treatment products, including Sebi Gel, Sebi Serum, Sebi Cleanser, and ATO Gel, significantly improved skin hydration, reduced acne breakouts and comedones, and exhibited excellent safety profiles with no reported cases of erythema or edema. Participant feedback highlighted high levels of satisfaction with the products' texture, absorption, and tolerability. These results support the efficacy and safety of Siodil products in managing acne-prone skin. However, further studies with larger sample sizes, control groups, and extended follow-up periods are recommended to validate these findings and explore long-term benefits.

---

## **Compliance with ethical standards**

#### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

#### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

---

## **References**

- [1] Rocha MA, Bagatin E. Skin barrier and microbiome in acne. *Arch Dermatol Res.* 2018 Apr 1;310(3):181–5.
- [2] Perkins AC, Maglione J, Hillebrand GG, Miyamoto K, Kimball AB. Acne Vulgaris in Women: Prevalence Across the Life Span. *Journal of Women's Health.* 2012 Feb;21(2):223–30.
- [3] Spencer EH, Ferdowsian HR, Barnard ND. Diet and acne: a review of the evidence. *International Journal of Dermatology.* 2009;48(4):339–47.
- [4] Alexis A, Woolery-Lloyd H, Andriessen A, Kang S, Rodriguez D, Callender V. Racial/Ethnic Variations in Acne: A Practical Algorithm for Treatment and Maintenance, Including Skincare Recommendations for Skin of Color Patients With Acne. *J Drugs Dermatol.* 2022 Nov 1;21(11):s13223–132214.
- [5] Rubin IK. Efficacy of a Non-Comedogenic Hair Care Regimen for the Reduction of Mild-to-Moderate Truncal and Facial Acne: A Single-Arm 8-Week Study. *J Drugs Dermatol.* 2021 Jun 1;20(6):690–3.
- [6] Gollnick HPM, Draelos Z, Glenn MJ, Rosoph LA, Kaszuba A, Cornelison R, et al. Adapalene–benzoyl peroxide, a unique fixed-dose combination topical gel for the treatment of acne vulgaris: a transatlantic, randomized, double-blind, controlled study in 1670 patients. *British Journal of Dermatology.* 2009 Nov 1;161(5):1180–9.
- [7] Tan JKL. Adapalene 0.1% and benzoyl peroxide 2.5%: a novel combination for treatment of acne vulgaris. *Skin Therapy Lett.* 2009;14(6):4–5.
- [8] Fabbrocini G, Panariello L. Efficacy and tolerability of a topical gel containing 3% hydrogen peroxide, 1.5% salicylic acid and 4% D-panthenol in the treatment of mild-moderate acne. *G Ital Dermatol Venereol.* 2016 Jun;151(3):287–91.
- [9] Kim MR, Kerrouche N. Combination of benzoyl peroxide 5% gel with liquid cleanser and moisturizer SPF 30 in acne treatment results in high levels of subject satisfaction, good adherence and favorable tolerability. *Journal of Dermatological Treatment.* 2018 Jan 2;29(1):49–54.
- [10] Chellathurai BJ, Anburose R, Alyami MH, Sellappan M, Bayan MF, Chandrasekaran B, et al. Development of a Polyherbal Topical Gel for the Treatment of Acne. *Gels.* 2023 Feb;9(2):163.

- [11] Baumann LS, Oresajo C, Yatskayer M, Dahl A, Figueras K. Comparison of clindamycin 1% and benzoyl peroxide 5% gel to a novel composition containing salicylic acid, capryloyl salicylic acid, HEPES, glycolic acid, citric acid, and dioic acid in the treatment of acne vulgaris. *J Drugs Dermatol*. 2013 Mar;12(3):266–9.
- [12] Collier CN, Harper JC, Cantrell WC, Wang W, Foster KW, Elewski BE. The prevalence of acne in adults 20 years and older. *Journal of the American Academy of Dermatology*. 2008 Jan 1;58(1):56–9.
- [13] Shen Y, Wang T, Zhou C, Wang X, Ding X, Tian S, et al. Prevalence of Acne Vulgaris in Chinese Adolescents and Adults: A Community-based Study of 17,345 Subjects in Six Cities. *Acta Dermato-Venereologica*. 2012;92(1):40–4.
- [14] Costa STB, Tapadinhas C, Sampaio ML. Acne prevalence and characterization in adolescents. *European Journal of Pediatric Dermatology*. 2021 Nov 12;31(4):203–12.
- [15] Dréno B. Recent data on epidemiology of acne. *Annales de Dermatologie et de Vénérologie*. 2010 Dec 1;137(12, Supplement 2):3–5.
- [16] de Lucas R, Moreno-Arias G, Perez-López M, Vera-Casaño Á, Aladren S, Milani M, et al. Adherence to drug treatments and adjuvant barrier repair therapies are key factors for clinical improvement in mild to moderate acne: the ACTUO observational prospective multicenter cohort trial in 643 patients. *BMC Dermatology*. 2015 Sep 11;15(1):17.
- [17] Falla T, Rodan K, Fields K, Ong D, Skobowiat C. Safety and efficacy of a novel three-step anti-acne regimen formulated specifically for women. *International Journal of Women’s Dermatology*. 2020 Dec 1;6(5):419–23.
- [18] Chen L, Lu L, Tu S, Zhang T, Du X, Chen L, et al. Efficacy and safety of 5% glycolic acid-based Gel essence in the treatment of mild to moderate acne. *J Cosmet Dermatol*. 2022 Oct;21(10):4482–9.
- [19] Zouboulis CC, Fischer TC, Wohlrab J, Barnard J, Alió AB. Study of the efficacy, tolerability, and safety of 2 fixed-dose combination gels in the management of acne vulgaris. *Cutis*. 2009 Oct;84(4):223–9.
- [20] Gencebay G, Aşkın Ö, Serdaroğlu S. Evaluation of the changes in sebum, moisturization and elasticity in acne vulgaris patients receiving systemic isotretinoin treatment. *Cutaneous and Ocular Toxicology*. 2021 Apr 3;40(2):140–4.
- [21] Wheeland RG, Koreck A. Safety and Effectiveness of a New Blue Light Device for the Self-treatment of Mild-to-moderate Acne. *J Clin Aesthet Dermatol*. 2012 May;5(5):25–31.

## Appendix 1:



Figure 1: Patch test: Finn Chamber Method (Before)



Figure 2: Patch test: Finn Chamber Method (After)