doi:10.36849/JDD.9002

Examining an Antioxidant Biostimulating Treatment for Dark, Postinflammatory Hyperpigmentation-Prone Skin

Sofia Iglesia MS,[a] Lauryn Reid MD,[a] Tatiana Kononov BS MBA,[a]
Alisar S. Zahr PhD,[a] Caroline Robinson MD[b]

[a]Revision Skincare®, Irving, TX
[b]Tone Dermatology, Chicago, IL

ABSTRACT

Skin rejuvenation treatments, including chemical peels and biostimulatory therapies, aim to improve facial aging concerns. However, these treatments have limitations, including efficacy, safety, postinflammatory hyperpigmentation in dark skin types, and downtime. An Antioxidant Biostimulating Treatment (ABT) is an innovative approach that integrates the principles of chemical peels and biostimulatory therapies to deliver superior benefits with traditional invasive and non-invasive therapies, while reducing the risk of adverse events. ABT utilizes a multi-acid delivery system to create controlled epidermal fissures, facilitating the safe delivery of phytocompound antioxidant acids into the dermis for skin rejuvenation. The safety and efficacy of the ABT were assessed in patients with Fitzpatrick Skin Types (FST) V-VI with mild to moderate global facial radiance, skin smoothness, and overall appearance. The ABT improved overall appearance, radiance, and skin smoothness after three sessions spaced 4 weeks apart. The ABT was well tolerated with no incidence of postinflammatory hyperpigmentation or other adverse events. The ABT addresses the critical need in offering patients safe, non-invasive, and comprehensive skin rejuvenation treatment options with demonstrated efficacy in all skin tones.

J Drugs Dermatol. 2025;24(10):1046-1049. doi:10.36849/JDD.9002

INTRODUCTION

Skin rejuvenation treatments, including chemical peels and biostimulatory therapies, improve signs of aging; however, they have limitations, including invasiveness, efficacy, safety, and extensive downtime.[1]

Chemical peels are well-known for skin rejuvenation benefits, including improvement in skin texture, fine lines, and wrinkles. Chemical peels traditionally utilize glycolic, lactic, and salicylic acids to target the outermost skin layers to improve texture and tone. However, they do not directly address collagen and elastin regeneration. Additionally, the lack of innovation in acid types utilized prevents treatment optimization. There may be a broader scope of bioactive acids to enhance efficacy.[2,3] Biostimulatory treatments induce dermal remodeling through a targeted approach. However, these treatments are invasive and have limitations, including efficacy, safety, and recovery time.[4]

With the advancement of modern technology, individuals can achieve the skin rejuvenation benefits of traditional invasive and non-invasive therapies with limited patient downtime.[5] Plant-derived bioactive compounds are unique and target multiple aging pathways, by providing antioxidant and anti-inflammatory benefits, while being well tolerated with a high safety profile.[6-7]

An Antioxidant Biostimulating Treatment (ABT) was formulated with a multi-acid delivery system, where a chemoexfoliation base, including typical alpha- and beta-hydroxy acids, induces epidermal exfoliation to optimally deliver a unique blend of biostimulating phytocompound acids. These biostimulating phytocompound antioxidant acids, including betulinic, oleanolic, asiatic, ursolic, and madecassic acids, upregulate collagen I and elastin for skin rejuvenation.[8] In a previous 12-week open-label clinical study, the ABT improved fine lines, skin laxity and texture, pores, radiance, and clarity in individuals with Fitzpatrick Skin Types (FST) I to V.[8]

This case study expands the previous investigation to include FST VI. We hypothesize the ABT will improve clinical outcomes in skin of color patients after a series of three progressive sessions, every 4 weeks, without adverse events.

PATIENTS AND METHODS

A single-center, open-label, IRB-approved, 12-week case study assessed the ABT efficacy and tolerability on 11 healthy female subjects aged 45 to 65, with FST V–VI and mild to moderate global facial radiance, skin smoothness, and overall appearance, based on a 10-point modified Griffiths scale.[9]

TABLE 1.

Skincare Regimen Utilized to Support Clinical Case Study			
Washout Period Skincare Regimen (3 Days)			
Morning (AM)	Gentle Foaming Cleanser, Basic Facial Moisturizer, Basic sunscreen SPF 30		
Evening (PM)	Gentle Foaming Cleanser, Basic Facial Moisturizer		
Antioxidant Biostimulating Treatment Protocol			
Steps	**Instructions**		
Cleansing	Double cleanse entire face with a Cleansing Gel		
Prepping Solution	Apply a defatting skin solution to the entire face		
Occlusive Barrier	Apply an occlusive barrier to the mucus membranes		
Antioxidant Biostimulating Treatment (ABT) Application	Apply the ABT to the entire face at 2 minutes intervals. At the final 2-minute interval, remove ABT with cool water-soaked cotton		
Biocellulose Mask (BM)	Apply a soothing Biocellulose Mask to the entire face for 5 – 10 minutes		
Post Procedure Cream (PPC)	Apply the Post Procedure Cream to the entire face		
Skincare Regimen (12 weeks)			
	ABT Day (Baseline, week 4, and 8)	**Day 1 – 2 after ABT**	**Day 3 after ABT and until next clinical timepoint**
Morning (AM)	"Gentle Foaming Cleanser Post Procedure Cream Basic Sunscreen SPF 30"	"Gentle Foaming Cleanser Post Procedure Cream Basic Sunscreen SPF 30"	"Gentle Foaming Cleanser Basic Facial Moisturizer Basic Sunscreen SPF 30"
Evening (PM)	"Gentle Foaming Cleanser Post Procedure Cream"	"Gentle Foaming Cleanser Post Procedure Cream"	"Gentle Foaming Cleanser Basic Facial Moisturizer"

Subjects completed a 3-day washout prior to baseline. An aesthetician applied the ABT, composed of 23% acids with a pH of 2.5, to the subjects' faces in a series of 3 progressive sessions every 4 weeks (baseline, week 4, and week 8). From baseline, subjects followed a 12-week skincare regimen (Table 1).

Investigator clinical efficacy, clinical photography, tolerability, and self-assessment questionnaires (SAQ) were completed at baseline, and weeks 4, 8, and 12. The study was approved by Advarra IRB (MS) and conducted according to the Declaration of Helsinki and Good Clinical Practice. All subjects signed an IRB-approved informed consent form and photography release form.

Investigator clinical efficacy was performed by a board-certified dermatologist, who evaluated visual skin smoothness, tactile laxity, radiance, and overall appearance using a modified Griffith's 10-point scale (0 = none, to 7-9 = severe).[9] Clinical photography was captured with the VISIA-CR Photostation (Canfield Imaging Systems, Fairfield, New Jersey) of the subject's right, center, and left views, and Antera 3D® (Miravex Ltd, Dublin, Ireland) of the subject's left cheek. Tolerability was evaluated by the investigator (erythema, edema, and dryness) and subjects (burning, stinging, and itching) using a 4-point scale (0 = none to 3 = severe). Subjects rated SAQs statements on a 5-point scale (1 = worst condition / completely disagree to 5 = best condition / completely agree). The investigator assessed safety by monitoring adverse events, particularly the incidence of postinflammatory hyperpigmentation (PIH).

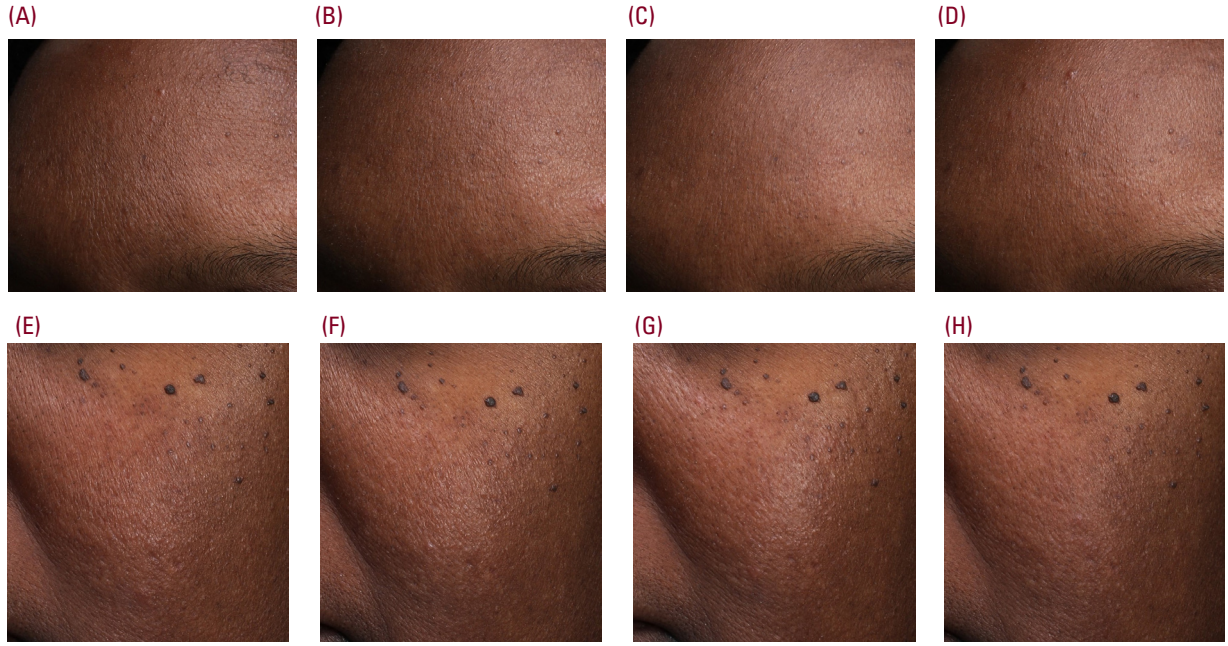
Statistical analysis included all subjects who completed the case study. Mean change from baseline was calculated for post-baseline time points. Student t-test analysis was performed at 95% confidence ($P \leq 0.05$). A decreased value reflects improvement. Antera 3D® image analysis evaluated average redness (hemoglobin concentration) and variation (uniformity) after BM application compared to after ABT. The percentage of subjects improved (decreased value) was determined. Skin quality SAQ responses were analyzed for the percentage of subjects improved (increased score value) at post-baseline timepoints compared with baseline. Biocellulose Mask (BM) and Post-Procedure Cream (PPC) SAQ responses were analyzed using top box analysis. The percentage of subjects who favorably agreed was determined for each parameter (scores 4–5).

RESULTS

Eleven (11) females, FST V (73%) and VI (27%), aged 45 to 56 (mean age 50) completed the case study.

Clinical efficacy evaluations showed a statistically significant 19% mean improvement in overall appearance of skin condition (healthy) after 3 ABT sessions, compared with

FIGURE 1. VISIA-CR Clinical Photography in standard light of a female aged 49 with Fitzpatrick skin type VI forehead (A-D) and right cheek (E-H) at baseline (A, B), after first (B, F), second (C, G), and third (D, H) Antioxidant Biostimulating Treatment

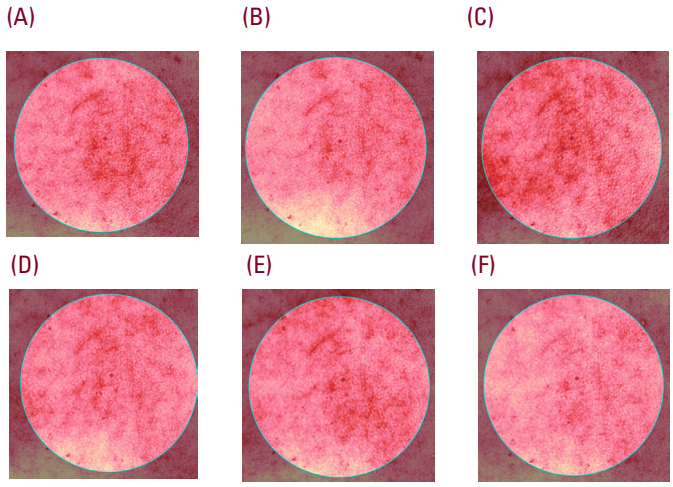


baseline (P<0.05). Additionally, mean improvements of 20% in radiance and 16% in skin smoothness were achieved after 3 ABT sessions, compared with baseline (P=0.08). Progressive visual improvement in fine lines, skin smoothness, and overall appearance is evident in Figure 1. Additionally, 73% of subjects demonstrated improvement in overall appearance, and 55% of subjects demonstrated improvement in radiance and visual skin smoothness.

Antera 3D® imaging analysis showed that the BM improved facial skin redness in approximately 50% of subjects after receiving 2 to 4 treatment layers, highlighting its soothing benefits. The BM improved skin complexion evenness, with 30%, 70%, and 73% of subjects' facial redness variation improved after BM application when compared with immediately after each ABT session, respectively. Visual improvements are demonstrated in Figure 2.

The ABT protocol was well tolerated and positively perceived by the subjects. There were no occurrences of PIH following the ABT or other adverse events, indicating its suitability for higher Fitzpatrick patients. Immediately after the ABT protocol, subjects experienced a slight increase in erythema and edema, which is a common skin response to chemical treatments. Erythema decreased, while edema resolved before the next treatment. Furthermore, the ABT led to a statistically significant mean reduction in facial dryness by 36% and 55% after the second and third sessions, compared to before ABT session, respectively (P<0.05).

FIGURE 2. Antera 3D® Clinical Photography in Redness of a female aged 51 with FST V Left Cheek before (A, C, E) and after Biocellulose Mask (B, D, E) after first (A, B), second (C, D), and third (E, F) ABT.



Burning, stinging, and itching increased immediately after ABT, which was expected with chemical treatments.[8] The BM and PPC alleviated burning, stinging, and itching. Burning significantly decreased after the first, second, and third treatments, with a 77%, 64% and 59% mean reduction after BM and PPC application, compared with immediately after ABT, respectively (P<0.05).

Subjects reported favorable satisfaction with the ABT, BM, and PPC. Subjects reported that the ABT improved their skin

quality after completing the treatment series. At week 12, 91% of subjects perceived an improvement in their overall skin appearance, and 73% of subjects perceived an improvement in skin radiance, appearance of pores, healthy-looking skin, and youthful-looking skin, compared with baseline. Additionally, 100% of subjects favorably agreed that the BM "felt calming and soothing on my skin following the treatment". Furthermore, 100% of subjects favorably agreed that the PPC "provided immediate relief from dryness following the treatment" and "reduced irritation immediately and following the treatment".

DISCUSSION

Skin rejuvenation treatments, including chemical peels and biostimulatory therapies, have gained popularity.[10] However, their application on the skin of color individuals requires careful consideration due to safety risks, including PIH. Historically, many treatments have been evaluated in lighter skin tones, raising questions about their safety and efficacy in patients of color.[11,12] There is a critical need to evaluate aesthetic treatments across a broad patient population.

An Antioxidant Biostimulating Treatment (ABT) was designed using an innovative multi-acid delivery system that combines the benefits associated with chemical peels and biostimulatory therapies. The multi-acid delivery system creates epidermal fissures to effectively deliver phytocompound antioxidant acids into the dermis for enhanced skin rejuvenation.

This present case study validates the ABT skin rejuvenating benefits to a skin of color population, specifically FST V and VI individuals. The ABT produced statistically significant improvement in overall appearance (+19%) with trends in improvement in radiance (+20%) and skin smoothness (+16%). The ABT demonstrated to be safe, well tolerated with minimal downtime, and no incidences of PIH. This highlights its safety and efficacy for darker skin type patients. These findings have the potential to redefine skin rejuvenation protocols for patients with darker skin tones, offering safer and inclusive treatment options.

The ABT addresses a critical need for inclusivity in dermatological studies and treatment development. By combining the benefits of chemical peels and biostimulatory therapies, it provides a safe and comprehensive skin rejuvenation solution for a broad patient population. While the findings are promising, the authors acknowledge that the small sample size and absence of a control group are study limitations. Future larger studies are needed to confirm the trends presented in this manuscript.

DISCLOSURES

The study was sponsored by Revision Skincare®. Dr Reid was a paid consultant for this clinical study. Dr Robinson has performed clinical trials and consulting for a variety of organizations and served in multiple leadership capacities. Dr Robinson has served as a clinical investigator for this case study. Ms Iglesia and Dr Zahr are employees of Revision Skincare® and analyzed the statistical data. All authors contributed to the draft and review of the manuscript. All data analyses were conducted independently to ensure unbiased reporting.

Clinicaltrials.gov ID NCT06633731. The study was approved by Advarra IRB (MD, USA).

REFERENCES

1. Chaudhary M, Khan A, Gupta M. Skin ageing: pathophysiology and current market treatment approaches. *Curr Aging Sci.* 2020;13(1):22-30. doi:10.2174/1567205016666190809161115
2. Pathak A, Mohan R, Rohrich RJ. Chemical peels: role of chemical peels in facial rejuvenation today. *Plast Reconstr Surg.* 2020;145(1):58e-66e.
3. Fulton JE, Porumb S. Chemical peels. *Am J Clin Dermatol.* 2004;5(3):179-187.
4. Murakov S, Razumovskaya EA, Zakharov DY, et al. Poly-L-lactic acid in aesthetic medicine. *Plasticheskaya Khirurgiya I Esteticheskaya Meditsina.* 2023;101. doi:10.17116/plast.hirurgia2023041101
5. Nikalji N, Godse K, Sakhiya J, et al. Complications of medium depth and deep chemical peels. *J Cutan Aesthet Surg.* 2012;5(4):254-260. doi:10.4103/0974-2077.104913
6. Mohammad IS, Naveed M, Ijaz S, et al. Phytocosmeceutical formulation development, characterization and its in-vivo investigations. *Biomed Pharmacother.* 2018;107:806-817.
7. Ganesan P, Choi DK. Current application of phytocompound-based nanocosmeceuticals for beauty and skin therapy. *Int J Nanomedicine.* 2016;11:1987-2007.
8. Iglesia S, Jiang LI, Kononov T, et al. Effective skin rejuvenation by a novel antioxidant biostimulating treatment. *J Cosmet Dermatol.* 2025;24(4):e70196. doi: 10.1111/jocd.70196. PMID: 40277079; PMCID: PMC12023018.
9. Griffiths CEM. A photonumeric scale for the assessment of cutaneous photodamage. *Arch Dermatol.* 1992;128(3):347.
10. ASPS Procedural Statistics Release. https://www.plasticsurgery.org/news/plastic-surgery-statistics. Accessed February 1, 2025.
11. Rullan P, Karam AM. Chemical peels for darker skin types. *Facial Plast Surg Clin North Am.* 2010;18(1):111-131. doi:10.1016/j.fsc.2009.11.010
12. Salam A, Dadzie OE, Galadari H. Chemical peeling in ethnic skin: an update. *Br J Dermatol.* 2013;169 Suppl 3:82-90. doi:10.1111/bjd.12535

AUTHOR CORRESPONDENCE

Sofia Iglesia MS

E-mail:..... siglesia@revisionskincare.com