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A Double-Blind Randomized Preliminary Study Comparing the Efficacy and Tolerance of a New Retinoid Combination with the Equivalent Retinol Concentration in the Treatment of Skin Aging

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Abstract

Background: Retinol has consistently demonstrated efficacy in improving signs of skin aging. However, recent European Union regulations have limited its cosmetic concentration to 0.3%, creating the need for new formulations to be capable of maintaining high efficacy, safety, and tolerance. Material and Methods: This clinical study aimed to evaluate and compare the rejuvenating effects and tolerance of a 0.5% retinol serum with a new equivalent technology, Retinduo®, which previously showed promising preclinical results. A single-center, prospective, randomized, controlled, double-blind, two-arm parallel study was conducted in 40 Caucasian women aged 38–60 years with moderate photoaging (Glogau II). A total of 20 participants applied Retinduo® serum and 20 applied retinol 0.5%, following a progressive application protocol. Clinical and instrumental assessments measured hydration, firmness, elasticity, tone homogeneity, melanin levels, skin roughness, wrinkle parameters, and stratum corneum thickness. Results and Discussion: Both formulations significantly improved hydration, firmness, and elasticity from day 28 onward. Retinduo® showed a significant increase in viscoelasticity (R8) from day 56, while retinol 0.5% did not demonstrate significant changes in this parameter. Melanin reduction was observed with Retinduo® at days 28 and 56 and with retinol 0.5% just at day 28. Although a reduction in melanin was observed with both ingredients, the reduction was more significant with Retinduo® at 56 days. Both treatments reduced the thickness of the stratum corneum; however, with Retinduo®, a significant and more pronounced reduction was achieved after 3 months of treatment (30% (p = 0.0001) vs. 12% (p = 0.033). Retinduo® demonstrated significant wrinkle depth reduction at day 28 and in wrinkle amplitude (width and length of wrinkles) at the end of treatment, while 0.5% retinol showed a positive trend in this parameter. Both products exhibited excellent tolerance. Conclusions: Overall, Retinduo® achieved comparable or slightly superior anti-aging effects while aligning with current European regulatory limits.

Keywords: retinol; concentration; efficacy; tolerance; anti-aging; wrinkles; texture

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Academic Editor: Enzo Berardesca

Received: 13 April 2026
Revised: 20 May 2026
Accepted: 22 May 2026
Published: 26 May 2026

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1. Introduction

Retinol, a vitamin A derivative, is extensively acknowledged in dermatological and cosmetic research for its significant anti-aging and skin-renewing effects [1,2]. At the cuta-

neous level, it has been shown to induce an increase in collagen biosynthesis, accelerate epidermal turnover, and facilitate dermal regeneration [3]. In addition, it can also reduce tyrosinase expression and melanosome transfer, thereby contributing to notable improvements in skin texture, skin tone, and overall appearance [4,5]. Retinol has proven efficacy in diminishing fine lines, wrinkles, and pigmentation irregularities, which explains its frequent inclusion in formulations aimed at anti-aging and acne management [1,2,6].

Nevertheless, despite its advantageous properties, retinol application requires careful consideration. Depending on formulation and concentration, it may elicit adverse effects such as erythema, desquamation, or dryness, particularly in individuals with sensitive skin or those initiating retinoid therapy, which is known as retinoid dermatitis. Hence, selecting the optimal concentration and delivery system is essential to achieve maximum therapeutic benefit while minimizing undesirable effects.

Particularly, a change in legislation has been implemented regarding topical retinol concentration. In April 2024, the European Commission adopted Regulation (EU) 2024/996, revising Annex III of Regulation (EC) No 1223/2009 to introduce updated limitations on the permitted concentrations of retinol and its ester derivatives, including retinyl acetate and retinyl palmitate, in cosmetic formulations. According to the revised framework, body care lotions are now restricted to a maximum concentration of 0.05% retinol equivalent (RE), whereas all other topical preparations, whether leave-on or rinse-off, must not exceed a limit of 0.3% [7].

Within this context, comparative investigations of products containing varying retinol concentrations are essential to elucidate differences in efficacy, safety, and tolerability, thereby informing appropriate clinical and cosmetic use.

This study evaluated the new cosmetic technology Retinduo®, based on a retinoid combination of retinol 0.3% + retinal 0.05%, and two natural ingredients with a potential boosting effect, to complement the retinoid activity. In the case of retinol, a progressive release delivery system was utilized as a vehicle to enhance stabilization and achieve long-lasting effects. The 0.05% retinal was incorporated encapsulated in exclusive human-mimetic vegan nanovesicles (AOX®), maximizing the protection of the active ingredient and its penetration through the epidermal layers. Lastly, aiming to boost the retinoid activity, Retinduo® includes two different ingredients from natural origin. As retinoic acid is an endogenous cellular signal, cells possess control mechanisms that modulate its bioavailability and effects, thereby influencing the efficacy of exogenous retinoids. For instance, cells can modulate the levels of RAR/RXR receptors, which are necessary for retinoic acid intracellular signal transduction [8]. Moreover, under exogenous application, the cell can activate retinoic acid degradation by hydroxylation [9,10]. Thus, to maximize the retinoid signal, Retinduo® includes, on one hand, phytol, with reported activity increasing RXR levels, and on the other hand, apigenin (in the form of *Chamomilla recutita* flower extract), which has been reported to prevent retinoic acid hydroxylation [11,12].

Previous preclinical analyses have been performed aiming to demonstrate that the anti-aging effects of 0.5% retinol are maintained in the new technology, including just the permitted concentration of 0.3% retinol. The results in ex vivo models support similar efficacy of Retinduo® and 0.5% retinol in terms of increasing collagen and elastin production, restoring epidermal thickness, and improving tissue structure, as analyzed by histology (data on file).

In here, we report the first results addressing Retinduo® efficacy and tolerance in a clinical study, compared to 0.5% retinol. This study is, to our knowledge, the first randomized, double-blind clinical trial evaluating a retinoid combination (retinol 0.3% + retinal 0.05%) with boosting agents designed to assess equivalent efficacy to 0.5% retinol, while complying with the recent European regulatory restriction (Regulation (EU) 2024/996).

2. Materials and Methods

The aim of the study was to evaluate and compare the efficacy and tolerance of retinol 0.5% with the new retinoid combination, Retinduo® (0.5% retinol equivalent).

Study design: We performed a single-center, proof-of-concept, prospective, randomized, controlled, double-blind study. The study protocol was approved by the appropriate Scientific Committee. A total of 40 Caucasian female patients, aged between 36 and 60 years, with a moderate degree of photoaging (Glogau II scale) were included. The skin phototypes ranged from I to IV. The duration of the study was 3 months. The products were applied at night on clean, dry skin on the face, according to the assigned randomization.

A total of 20 subjects were assigned to the new retinoid combination (Retinduo®), and 20 subjects used the retinol that had been previously commercialized (retinol 0.5%). They all followed a retinization protocol which consisted of the use of the products three nights a week for the first and second week, alternate nights during the third and fourth week, and once every night during the second and third month. During the entire study, the individuals applied sunscreen SPF 50+ in the morning.

Evaluation visits were scheduled on T0 (basal)–T14 (call)–T28–T56–T84 (Table 1).

Table 1. Study schedule table.

Procedure	Measurement Zone	D0	From D0 to D27	D14	D28	From D28 to D55	D56	From D56 to D83	D84
Product weighing	—	•							•
Acclimation 15 min	—	•			•		•		•
Information about the subject, study conditions, and collection of her informed consent	—	•							
Verification of inclusion and non-inclusion criteria	—	•			•		•		•
Clinical examination by the dermatologist	Whole face	•			•		•		•
Application of the product by the subject at home, as a daily cream			•			•		•	
Wrinkle depth by analysis and photography with C-Cube	Crow's feet area (zone chosen by the technician)	•			•		•		•
Hydration with Corneometer®	Face (cheekbone, chosen at random)	•			•		•		•
Biomechanical properties of the skin with Cutometer® (firmness and elasticity parameters)	Face (cheekbone, chosen at random)	•			•		•		•
Tone homogeneity with Mexameter®	Spot on face + adjacent area	•			•		•		•
Evaluation of the reduction in the stratum corneum with D-Squame	Face (forehead)	•			•		•		•
Follow-up call to subjects (report of any discomfort or signs, and especially self-assessment of peeling)	—			•					
VISIA photographs	Frontal + 2 profiles	•			•		•		•
Subjective evaluation questionnaire	—								•
Potential adverse events collection	—					•			

The point (•)refers to the visits during which the corresponding evaluation was performed.

Evaluation assessments included clinical examination by dermatologist, photographs with VISIA CR (front, face and profiles) (Canfield Scientific, Parsippany, NJ, USA), assessment of tolerance by both the dermatologist (erythema, edema, dryness, desquamation, roughness, classified from none, very mild, mild, moderate or severe) and the patient (edema, dryness, desquamation, roughness, tightness, stinging, burning sensation) and registration of any adverse events. In addition, instrumental evaluations were analyzed:

- Depth and roughness of fine lines and wrinkles were assessed in the crow's feet area using C-Cube® (Pixience, Toulouse, France). Results are expressed as Skin Developed Interfacial Area Ratio (Sdr, %), which represents the additional surface area due to skin texture compared to the baseline area. Photographs obtained with C-Cube® reconstruct 3D images by analyzing multiple images captured under different lighting conditions, using the stereophotometry technique.
- Hydration measurements using Corneometer® (Courage + Khazaka electronic GmbH, Cologne, Germany). Values represent moisture levels in the stratum corneum, using capacitance in Arbitrary Units (A.U.), typically ranging from 0 to 120. (<30 A.U.: very dry skin; 31–50 A.U.: dry to normal skin; >51: sufficiently hydrated to well-moisturized skin).
- Skin firmness and elasticity were assessed using the Cutometer® (Courage + Khazaka electronic GmbH, Cologne, Germany), a non-invasive suction-based device that measures the mechanical properties of the skin by quantifying its deformation and recovery under controlled negative pressure. Particularly, we analyzed the following parameters: R0 (skin distensibility, inversely related to firmness, with lower values indicating higher firmness), R1 (residual deformation, reflecting recovery capacity), and R8 (immediate elastic recovery, indicative of skin elasticity).
- Tone homogeneity efficacy using the Mexameter® (Courage + Khazaka electronic GmbH, Cologne, Germany). The effect of the product on tone homogeneity was assessed by comparing the skin color on the dark spot chosen, before and after treatment (DO, D28, D56, and D84), compared with the skin color of the adjacent area.
- Collection of epidermic material using the D-Squam® (Cuderm Corporation, Dallas, TX, USA) to measure the desquamation of the stratum corneum.

Inclusion criteria included women aged 35–60 years old, with skin phototypes I–IV and all skin types (dry, normal, combination, and oily skin), with a moderate degree of photoaging (Glogau II scale), hyperpigmented spots on the face, non-homogeneous skin, and presence of crow's feet with a score of between 2 and 3. All subjects provided informed consent after demonstrating understanding of the study procedures. Exclusion criteria included: subjects with sensitive/reactive skin panel or with cutaneous pathology on the study zone; those at risk of pregnancy for at least 3 months before the beginning of the study; and under treatment, prior to the study, able to interfere with the interpretation of the study results (particularly, systemic retinoids within the 6 months, other systemic anti-acne medication within the 3 months, topical retinoids within the 3 months, other topical anti-acne medication within the month, anti-acne cosmetic products within the 2 weeks, topical or systemic medication with anti-inflammatory, antibiotic or antihistamine products within the 2 weeks or those under hormonal treatment).

Statistical analysis: For statistical analysis, all data collected on treatment were first tested for normality using the Shapiro–Wilk method. Parametric variables were analyzed using paired *t*-tests, while non-parametric variables were assessed with the paired Wilcoxon test. Normalized data were reported in the text as percentage changes relative to baseline. A p-value ≤ 0.05 proved statistical significance.

To evaluate the significance of the answers to the subjective evaluation questionnaire, the 95% confidence interval was determined according to the Wilson method and compared to the theoretical proportion of 50%. If the *p*-value was $\leq$0.05, the conclusion is that the proportion of positive answers is significantly superior to 50%. The software used was EXCEL (Microsoft 365 version) and STATGRAPHICS (Centurion 19 version).

3. Results

A total of 45 volunteers were included, and 40 volunteers finished the study. The five patients who withdrew from the study did so for reasons unrelated to the study.

3.1. Moisturization

Based on the results, both formulations demonstrated a statistically significant moisturization increase since D28. However, no statistically significant differences were observed between the two formulations throughout the study period.

Both groups, Retinduo® and retinol 0.5%, showed a significant increase in the hydration level, $p < 0.05$. (Figure 1).

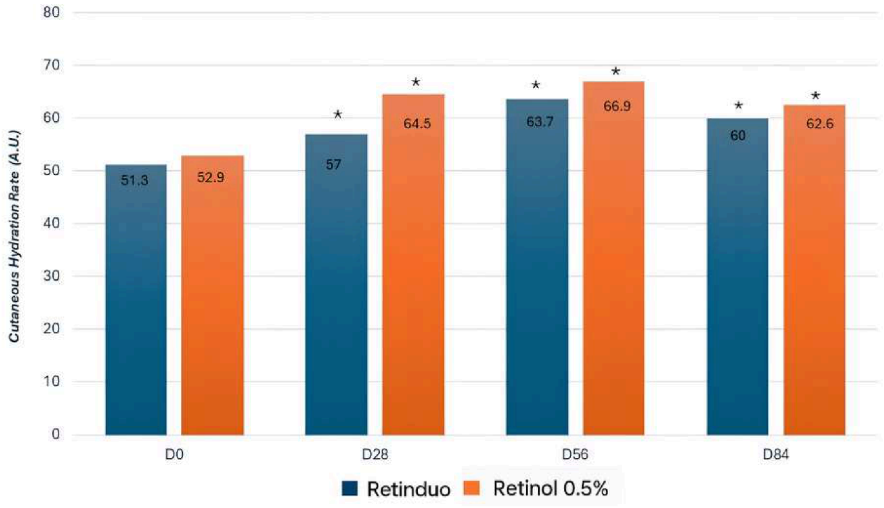


Figure 1. Cutaneous hydration rate (A.U.) Significant hydration increase was observed with Retinduo® and retinol 0.5% from D28. Individual values for each group were analyzed using Student's *t*-test. * ($p < 0.05$). Comparative analyses between groups were also performed using Student's *t*-test.

Retinduo® regimen showed a statistically significant increase in the hydration level of 11% ($p < 0.05$), 24% ($p < 0.001$), and 17% ($p < 0.01$), after 28, 56, and 84 days of use, respectively.

Retinol 0.5% regimen showed a statistically significant increase in the hydration level of 22% ($p < 0.05$), 26% ($p < 0.001$), and 18% ($p < 0.05$), after 28, 56 and 84 days of use, respectively.

3.2. Skin Firmness (R0)

A significant increase in skin firmness was achieved with both formulations from D28. This increase was close to 30% at the end of treatment for both formulations. No significant differences between groups were achieved. (Figure 2).

Retinduo® and 0.5% retinol significantly improved ($p < 0.001$) skin firmness at each treatment point and at the end of the treatment, by 26% and 30%, respectively.

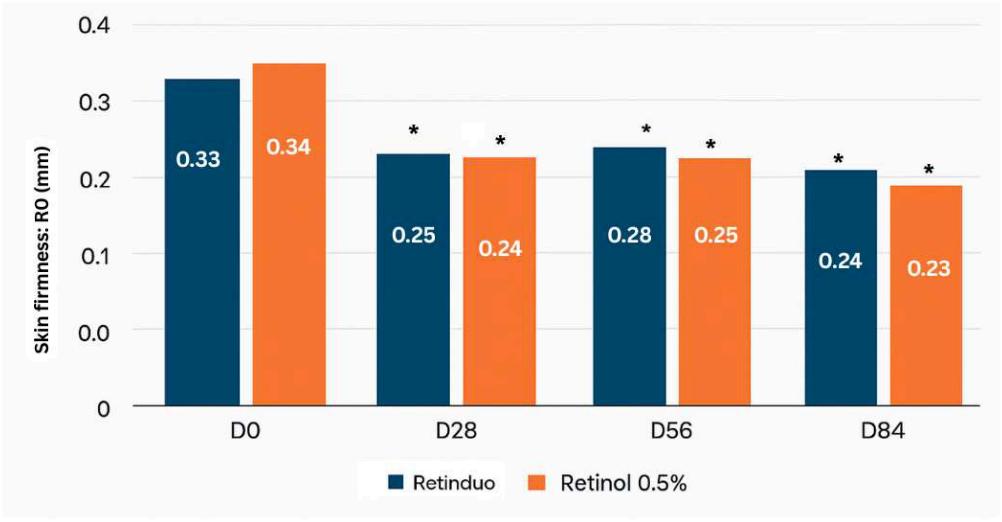


Figure 2. Skin firmness, R0 (mm). A significant improvement (decrease in R0 value compared to basal) was detected since D28, * ($p < 0.001$). Individual values for references Retinduo® and retinol 0.5% were analyzed using Student's *t*-test. Comparative analyses between groups were performed using Student's *t*-test.

3.3. Skin Elasticity (R1)

Both formulations demonstrated a statistically significant improvement in elasticity after 28, 56, and 84 days of use. No significant differences were observed between the two formulations throughout the study period (Figure 3).

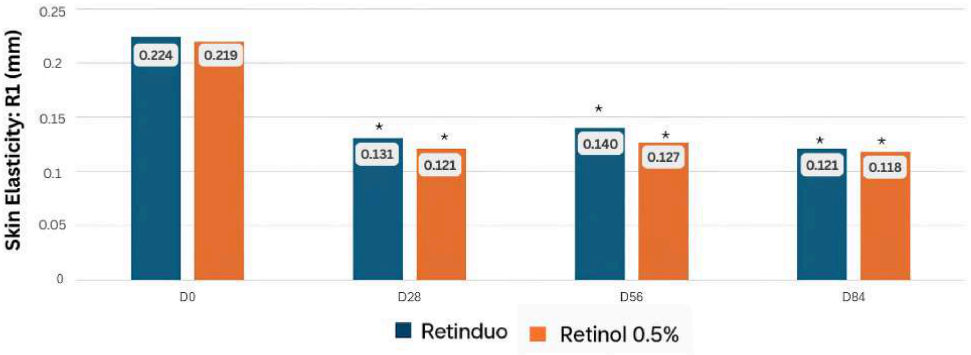


Figure 3. Skin elasticity, R1 (mm). A significant improvement of elasticity (decrease in R1 value compared to basal) was detected since D28, * ($p < 0.001$), without significant differences between groups, $p > 0.05$. Individual values for references Retinduo® and retinol 0.5% were analyzed using Student's *t*-test. Comparative analyses between groups were performed using Student's *t*-test.

Retinduo® and retinol 0.5% significantly improved the skin elasticity (R1) by 46% at the end of the study ($p < 0.001$).

Skin viscoelasticity (R8): Although both formulations improved skin viscoelasticity (R8) at all measurement time points, a statistically significant difference was observed at Day 56 in favor of the Retinduo® regimen ($p < 0.05$) (Figure 4).

Retinduo® regimen significantly improved the viscoelasticity of the skin (R8) by 29% at D56 ($p < 0.05$) and by 15% at D84 ($p < 0.001$). Retinol 0.5% improved skin viscoelasticity; however, the observed effect was not statistically significant.

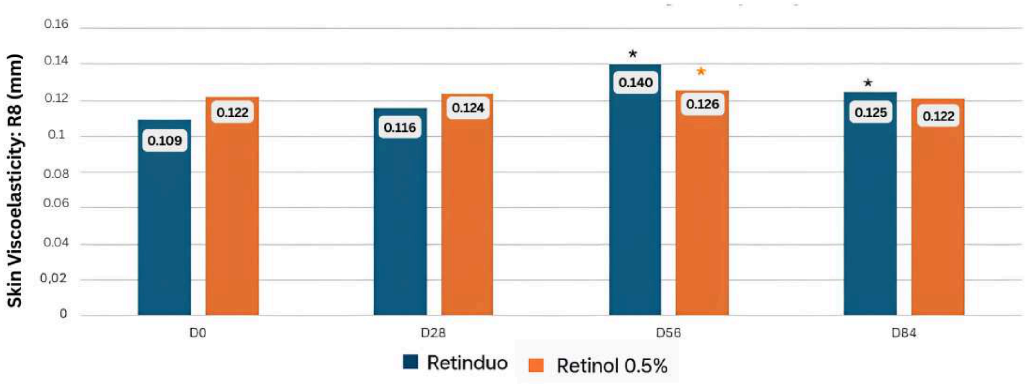


Figure 4. Skin viscoelasticity, R8 (mm). An increase in the R8 parameter reflects an increase in viscoelasticity. A significant improvement in D56 and D84 was observed with Retinduo® (* $p < 0.05$). In addition, a significantly higher increase was shown by the Retinduo® regimen in D56 compared to retinol 0.5% (* $p < 0.05$). All statistical analyses were performed using Student's *t*-test.

3.4. Melanin Rate

Based on the results, both formulations act on the melanin present in localized hyperpigmented spots without significant differences between the two formulations. Retinduo® regimen significantly decreased the melanin rate of skin (at the spot) by 4% at D28 ($p < 0.001$) and by 5% at D56 ($p < 0.001$). In contrast, the retinol 0.5% treatment results in decreasing the melanin rate of skin (at the spot) were significant just at D28, yielding a reduction of 6% ($p < 0.001$). Although further reductions were observed at D56 and D84, these changes were not statistically significant.

3.5. Skin Tone Evenness

Although the contrast between a specific spot and the adjacent area decreased over the study (increasing skin tone evenness), no statistically significant differences were found between the two formulations (Figure 5).

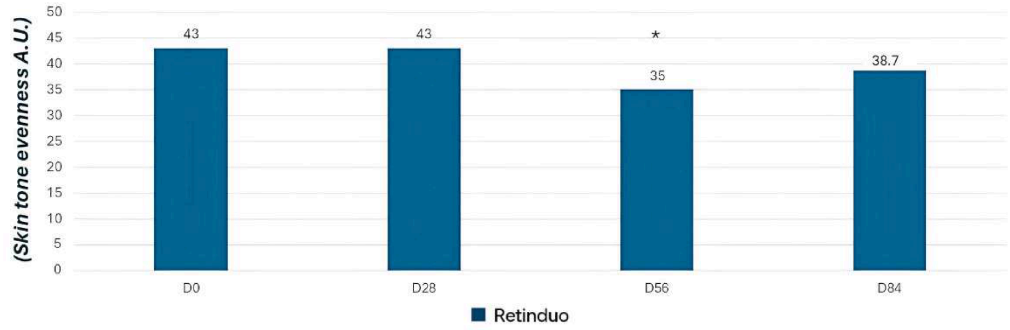


Figure 5. Skin tone evenness (A.U.) is determined as the lower the contrast between the spot and the adjacent area, the greater the evenness. A significant decrease in contrast between a spot and the adjacent area, reflecting an increase in skin tone evenness, was detected with Retinduo® 0.5% regimen at D56 (* $p < 0.05$). Statistical analyses were performed using Student's *t*-test.

At D56, the Retinduo® regimen significantly increased ($p < 0.05$) the skin tone evenness by +18% on average. With the retinol 0.5%, an improvement in skin tone uniformity was observed throughout the treatment period; however, the change was not statistically significant.

3.6. Skin Roughness

Both formulations were effective in reducing skin roughness. While the formulation with retinol 0.5% showed an earlier onset of action (from day 28), no statistically significant

differences were observed between the two formulations throughout the study period (Figure 6).

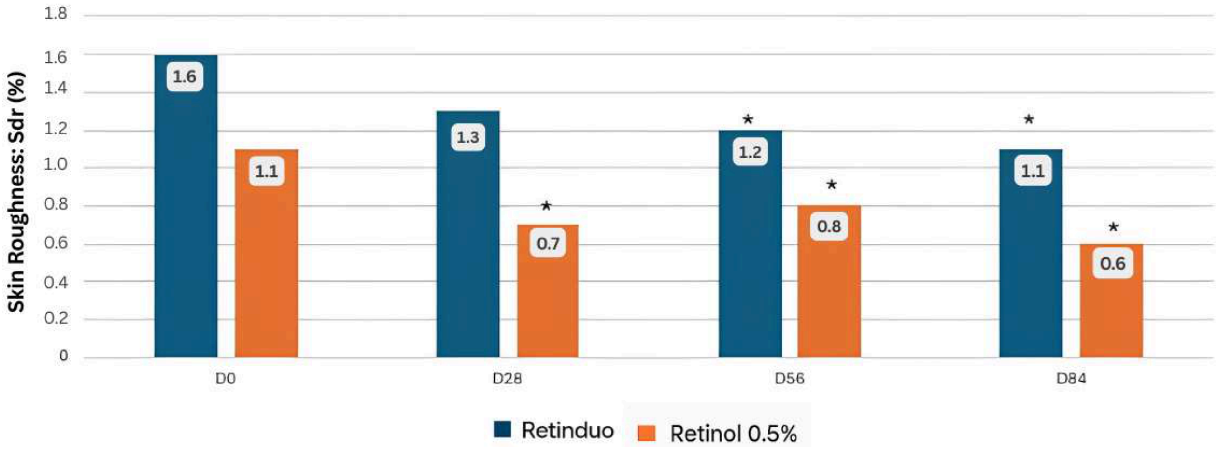


Figure 6. Skin roughness, Sdr (%). Significant decrease (* $p < 0.05$) in skin roughness was obtained with retinol 0.5% since D28 and with Retinduo® since D56, and maintained until the end of treatment. Results are expressed as Skin Developed Interfacial Area Ratio (Sdr, %), which represents the additional surface area due to the increment in roughness compared to the baseline area. For Retinduo®, the D28 value of parameter Sdr was analyzed using the Wilcoxon signed-rank test, while all remaining analyses were performed using Student's *t*-test.

3.7. Desquamation of the Stratum Corneum

The evaluation of the desquamation index revealed an increased and therefore normalization of the stratum corneum (SC) over 84 days of retinol treatment without statistically significant differences between the two groups.

At D28, the Retinduo® group showed a slight, non-significant change in the desquamation index (+2%). At D56, a transient increase (−4%) was observed, followed by a marked and statistically significant increase in desquamation at D84 (+30%; $p < 0.001$), reflecting enhanced corneocyte shedding and epidermal turnover.

In the retinol 0.5% group, an initial increase in the desquamation index was observed at D28 (−7%), which may reflect early barrier disruption and compensatory hyperkeratosis. This trend persisted at D56 (−8%). By the end of the study (D84), a moderate but statistically significant increase in desquamation (+12%; $p < 0.05$) was detected, suggesting progressive normalization of keratinocyte differentiation and stratum corneum turnover.

3.8. Wrinkles Evaluation

Wrinkle Depth: Reduction in wrinkle depth and amplitude was detected in both groups without statistically significant differences between the two formulations.

However, the Retinduo® treatment showed a reduction in wrinkle depth, which became statistically significant at D28 (early effect on wrinkle depth reduction). The average reductions observed were: −5% (D28, $p < 0.05$), −7% (D56, non-significant reduction, $p = 0.26$) and −11% (D84, $p = 0.12$). Throughout the study period, retinol 0.5% showed a non-significant reduction in wrinkle depth, although the observed changes suggest a positive effect.

For wrinkle amplitude (width and length), the Retinduo® regimen also demonstrated a consistent reduction. Although the downward trend was observed across all time points, it reached statistical significance at D28 (−7%) and D84 (−13%), $p < 0.02$ and $p < 0.03$, respectively. The retinol 0.5% reduced wrinkle amplitude throughout the study period (non-significant) (Figures 7–9).

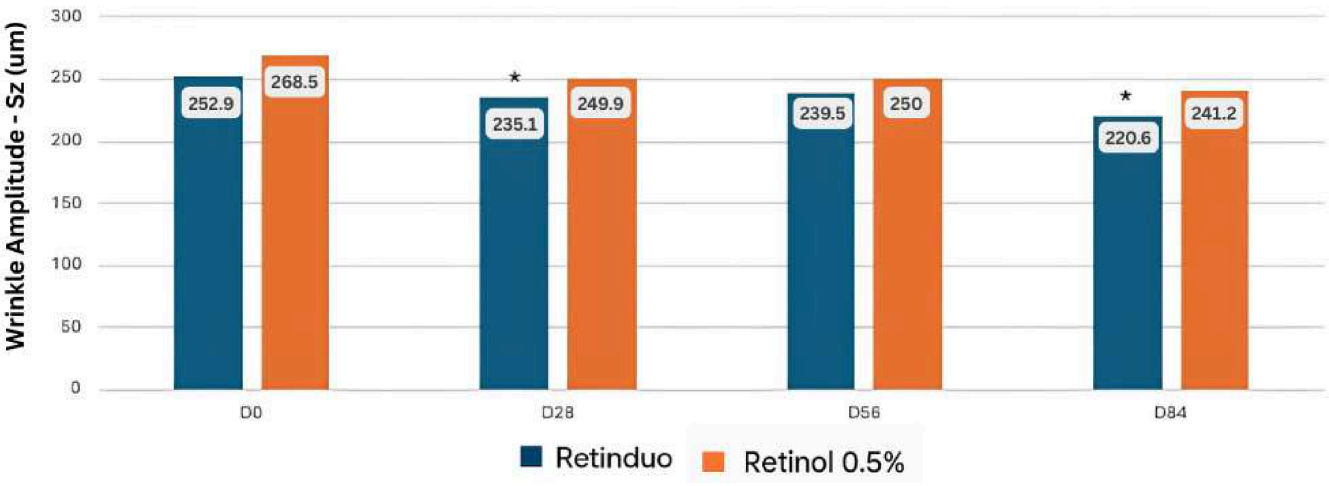


Figure 7. Wrinkle amplitude. The reduction in wrinkle amplitude was significant in the Retinduo® group at D28 and D84 (*), $p < 0.02$ and $p < 0.03$, respectively. All statistical analyses were performed using Student's *t*-test, except at D56 in the retinol 0.5% group, for which the Wilcoxon signed-rank test was used.

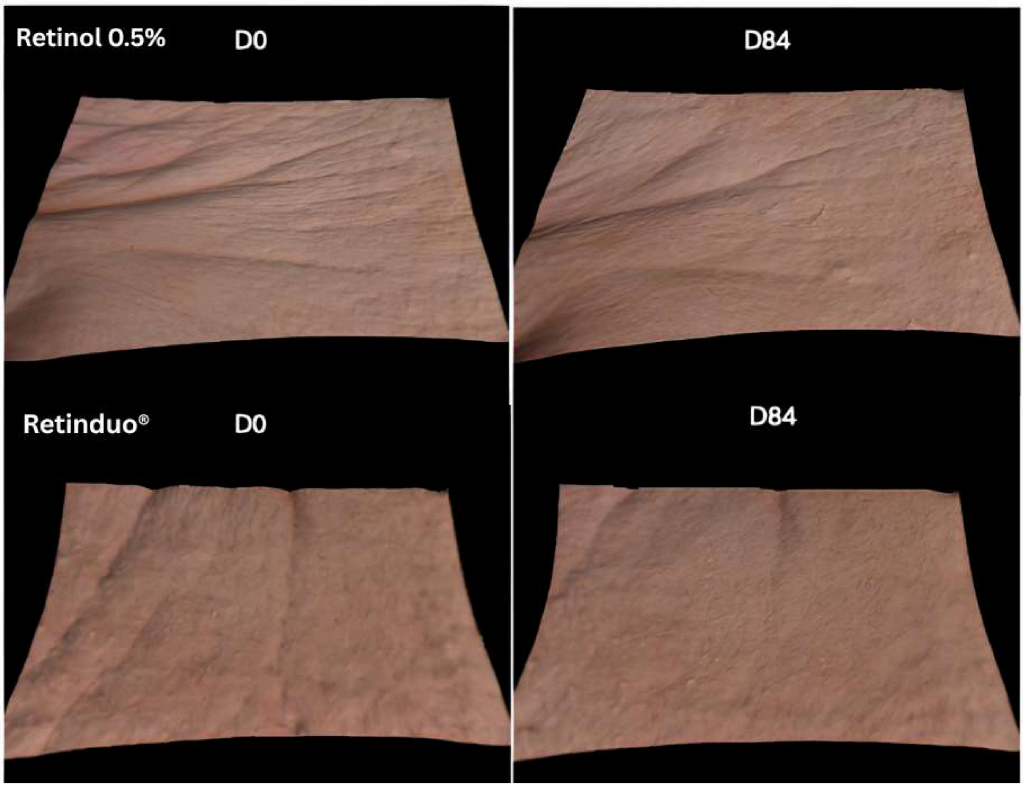


Figure 8. Photographs obtained with C-Cube® reconstruct 3D images by analyzing multiple images captured under different lighting conditions. In the example, skin treated with retinol 0.5% (**above**) is compared to Retinduo® 0.5% (**below**), from the beginning to the end of the study.

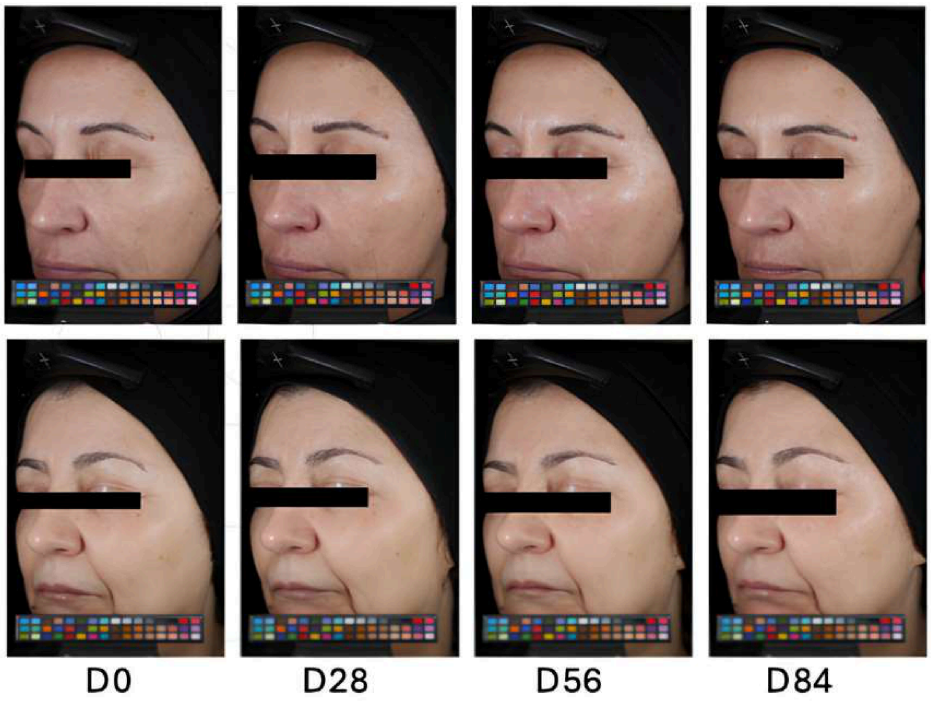


Figure 9. Visia photographs retinol 0.5% #31 (**above**) compared to Retinduo® 0.5% #8 (**below**). Improvement in skin quality evaluation was found for both treatments.

3.9. Tolerance

Only 4 patients (two under the Retinduo® 0.5% regimen and the other two under the retinol 0.5% regimen) reported adverse events, consisting of pruritus/erythema or stinging on eyelids, mild in most of the cases. In addition, one patient described moderate erythema on the neck area. No discontinuations occurred because of product intolerance.

No statistically significant differences were observed between the two products in terms of skin tolerance. The adverse effects observed with both treatments were very similar and included those that usually occur during treatment with retinoids (itching, flaking, redness, stinging). No relevant clinical signs reported by the dermatologist or by the subjects were reported at any visits with Retinduo®, supporting that the product was very well tolerated. Similar results were observed with retinol 0.5%.

3.10. Subjective Evaluation Questionnaire

The percentage of satisfied patients was very high (above 90% in almost all the items evaluated) and without statistical differences between groups.

4. Discussion

Despite the well-established efficacy of retinol, its dose-dependent adverse effects and the recent restrictions imposed by Regulation (EU) 2024/996 highlight the need for innovative strategies that maintain clinical benefits while improving tolerability and compliance. Among retinoids, tretinoin is considered the most effective agent with proven anti-aging effects, while retinol shows greater skin acceptance despite requiring longer application periods [2,13]. Retinol and retinoic acid derivatives have demonstrated significant efficacy in anti-aging treatments through their ability to stimulate cellular renewal, reduce wrinkles, and promote collagen formation [14,15]. Dra. Draelos et al. published a double-blinded, controlled, clinical study to compare the efficacy, tolerability, and consumer acceptance of retinol serums to tretinoin. They concluded that retinol serums were safe and effective with equivalent/or better performance and tolerability than tretinoin creams [16].

Clinical studies indicate that topical retinol application effectively modulates skin molecular biology with fewer side effects compared to more potent retinoids. However, common adverse effects include irritation, scaling, allergies, and erythema, particularly at high concentrations [14,17].

Novel delivery systems, encapsulation, and combinations with other substances like niacinamide show promising results in improving effectiveness while reducing irritation [18]. Specifically, the product under study combines a new sustained-release retinol system designed to improve molecular stability and prolong biological activity with retinal encapsulated in vegan nanovesicles (AOX®), which enhances the protection of the active ingredient and facilitates its effective penetration through the epidermis [14,17]. To enhance retinoid activity, Retinduo® incorporates two naturally derived ingredients. It is noteworthy that the new formulation combining retinoids and boosters has demonstrated excellent tolerability, as no relevant clinical signs were reported by either the investigator or the volunteers.

The study also reflected similar results in terms of efficacy of the different skin aging parameters for both formulations. The clinical and functional improvements induced by retinol regimens, which were endorsed by all the evaluated measurements in our study, are in accordance with previous studies that provided evidence of retinol's effects on molecular markers (increased glycosaminoglycan expression and procollagen I compared to vehicle) related to skin structure and function, supporting the clinical findings [19]. Following absorption, retinoids interact with distinct nucleic acid-binding and cytoplasmic receptors at the molecular scale, triggering mechanisms that modulate immune activity, inflammatory pathways, and various cellular processes, including differentiation and proliferation, thereby contributing to epidermal thickening [6,19,20].

Retinol influences the process of keratinization of the epidermis, which improves stratum corneum structure and reduces transepidermal water loss (TEWL) [20]. The reduction in TEWL was reflected in our study by the significant increase in skin moisturization. Furthermore, changes in the epidermis revealed that Retinduo® technology showed a tendency toward greater efficacy than 0.5% retinol in inducing epidermal differentiation, with an 18% difference between the two treatments in stratum corneum reduction at the end of treatment, observed as early as the first month of treatment, suggesting a more rapid improvement in skin texture. By the end of the study (D84), the Retinduo® group showed a marked, statistically significant SC reduction (−30%), indicating a sustained normalization of keratinocyte differentiation and desquamation, leading to enhanced epidermal renewal and reduced corneocyte retention ($p < 0.001$).

The structural changes induced by retinol include improvement of the fine lines and wrinkles associated with photoaging [6]. An early effect on wrinkle depth reduction was assessed with Retinduo®, whereas no significant changes were achieved with retinol 0.5% serum ($p < 0.05$ at D28). Similar results were found for wrinkle amplitude (width and length), where the Retinduo® regimen demonstrated a significant reduction at D28 and D84, whereas no significant results were achieved with retinol 0.5% serum. In accordance with this, the Retinduo® regimen showed a significantly higher efficacy than the previous retinol 0.5% in improving viscoelasticity (R8) at D56.

In addition, a reduction in hyperpigmentation and an increase in the evenness of the skin have also been associated with retinol use [21]. These pigmentation changes were also found in our study for both formulations, with significant improvement for the melanin content as fast as D28 for the Retinduo® technology.

Limitations of the study included the small sample size and the fact that the volunteers were all females.

5. Conclusions

This study demonstrated that both Retinduo® and retinol 0.5% treatments are effective in reducing clinical signs of skin aging, showing comparable outcomes in terms of efficacy. Throughout the trial, both formulations exhibited very good cutaneous tolerability, with participants showing very good adherence and minimal irritation during the retinization process. The newly developed technology achieved equivalent and even better anti-aging results while utilizing a lower concentration of retinol, thereby minimizing potential adverse effects. Moreover, this formulation complies with current European regulatory standards governing the safe use of retinoids in cosmetic applications.

The benefits achieved with Retinduo® are based on the smart formulation that enhances the stability, improves the penetration of the ingredients, and maximizes their activity, achieving similar and even better and faster results in some aging parameters.

Author Contributions: Conceptualization, J.J.A.-L., M.V. and A.L.-S.; methodology, J.J.A.-L., L.H. and A.L.-S.; software, M.V.; validation, J.J.A.-L.; formal analysis, M.T.T.-D., J.J.A.-L., M.V., L.H. and A.L.-S.; investigation, M.T.T.-D., J.J.A.-L., M.V. and A.L.-S.; resources, J.J.A.-L.; data curation, M.T.T.-D., M.V. and A.L.-S.; writing—original draft preparation, M.T.T.-D. and A.L.-S.; writing—review and editing, M.T.T.-D., J.J.A.-L., M.V., L.H. and A.L.-S.; visualization, M.T.T.-D., J.J.A.-L., M.V. and A.L.-S.; supervision, M.T.T.-D. and A.L.-S.; project administration, J.J.A.-L. funding acquisition, J.J.A.-L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Industrial Farmacéutica Cantabria SA. The funder had no role in the study design, data analysis, manuscript preparation, or the decision to publish.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee of Comité de Ética de la Investigación del Hospital Universitario Puerta de Hierro Majadahonda (Madrid, Spain), protocol code: Ref: 07/405410 and date of approval 12 September 2025.

Informed Consent Statement: Informed consent for participation was obtained from all subjects involved in the study. Informed consent for publication was obtained from all subjects involved in the study.

Data Availability Statement: The research data are available from the corresponding author upon reasonable request.

Acknowledgments: The authors would like to thank Eurofins Cosmetics Spain for their support and collaboration in this study. During the preparation of this manuscript/study, the authors used [ChatGPt4] for the purposes of polish the language of the manuscript. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: Author Ana López-Sánchez, Luisa Haya, Juan José Andrés-Lencina and María Vitale were employed by the company Cantabria Labs. The author(s) declare(s) that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Dr. Truchuelo occasionally collaborates as an external advisor for Cantabria Labs. and declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The authors declare that this study received funding from Cantabria Labs. The funder was not involved in the study design, collection, analysis, interpretation of data, the writing of this article, or the decision to submit it for publication. The funder did not affect the experimental process and results in the study. The funding relationship does not affect the scientific quality of the manuscript.

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