

Comparative evaluation of retinol, retinal, and hydroxypinacolone retinoate: efficacy and participant perceptions in a 4-week anti-aging regimen

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BACKGROUND

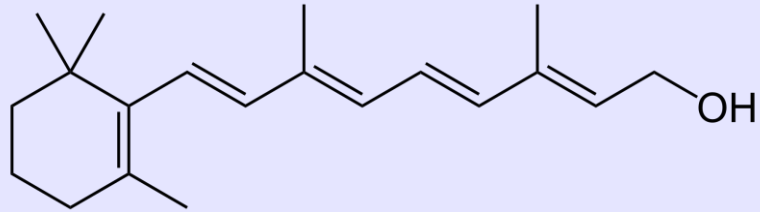
Retinoids are widely used in dermatology and aesthetic medicine due to their well-documented anti-aging properties. However, differences in efficacy and tolerability among various retinoid derivatives remain a topic of interest. This study compares the efficacy of three retinoids: retinol, retinal, and hydroxypinacolone retinoate (HPR), each at a concentration of 0.2% within the same base formulation, focusing on their effects on skin texture, wrinkles, hydration, and participant satisfaction after 4 weeks of nighttime use.

METHODS

A randomized, controlled study was conducted with 42 participants who applied one of the retinoid serums nightly for 4 weeks. Skin changes were measured using Visioscan and 3D skin image analysis (Visia) to evaluate epidermal roughness, wrinkle count, crease volume, nasolabial fold volume, and hydration-associated smoothness. UV spot reduction was also assessed. Participant satisfaction and subjective perceptions of efficacy were collected using a standardized questionnaire.

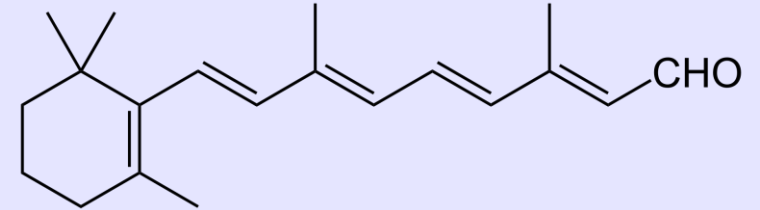
RESULTS

Serum with retinol



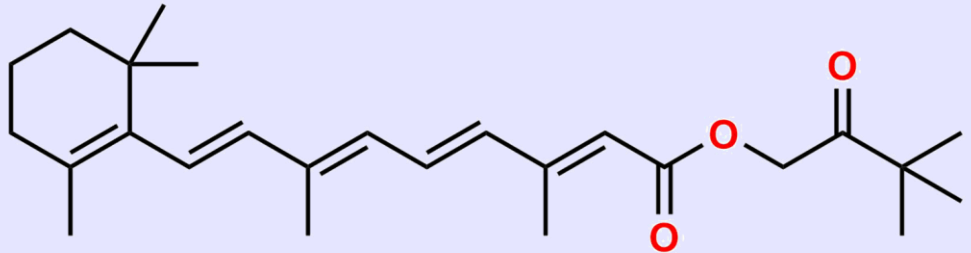
Epidermal roughness decreased by 25.9% across the group (data not shown), and wrinkle and crease volume dropped by 16% in 64% of participants.

Serum with retinal



Wrinkle count was reduced by 10.61%, and skin unevenness decreased by 12.09%, as determined by 3D imaging. Notably, nasolabial fold volume decreased by 36.39%, highlighting retinal's effectiveness for dynamic wrinkle areas.

Serum with HPR



This serum exhibited the strongest hydration-related effects, maintaining initial hydration levels and enhancing epidermal smoothness (by 14% in 50% of volunteers) and reducing wrinkle visibility (by 26% in 57% volunteers). It was also effective in reducing UV spots by 4.99%, addressing photodamage. Participant overall satisfaction was highest for the HPR serum (85%), compared to 77% for retinol and 79.67% for retinal. Participants using HPR serum reported the most positive perceptions of efficacy, with 71% noting improved smoothness (61% for retinol, 69.33% for retinal), 68% observing brighter and more even skin tone (retinol: 53%, retinal: 63%) and 69% experiencing improved firmness and elasticity (compared to 65% in the retinol group and 67.33% in retinal group).

The following tests were performed with the VISIA device

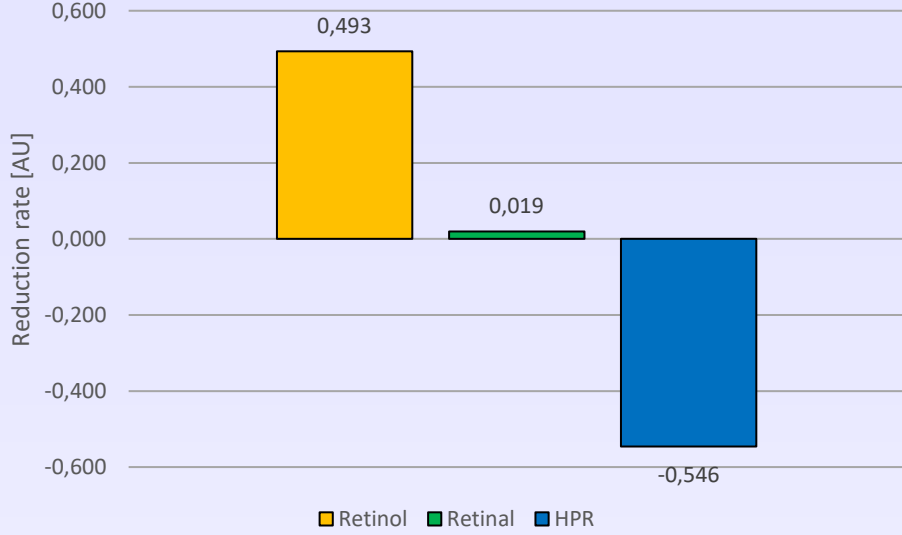


Figure 1. Instrumental measurement of the depth of wrinkles in the entire study group. The best results are visible for serum with HPR. No effect was observed for retinol and retinal.

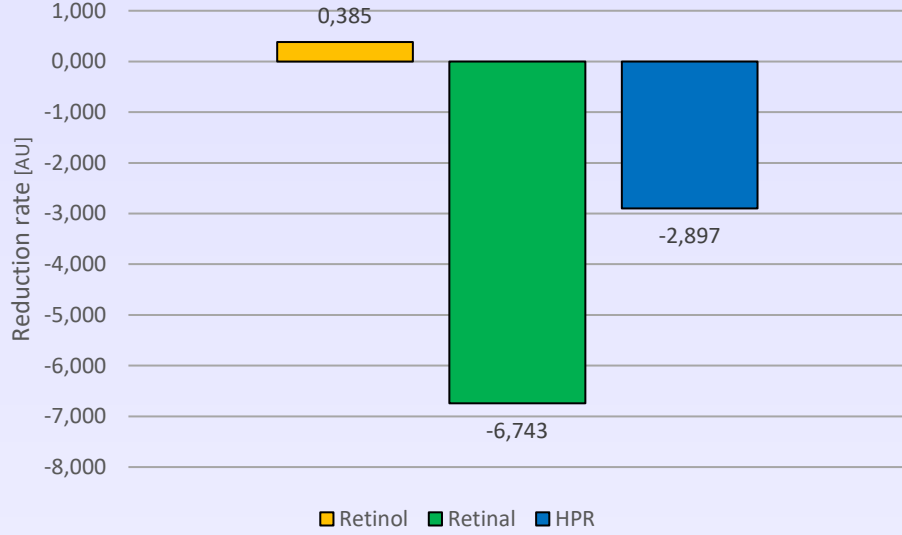


Figure 2. Instrumental measurement of the number of wrinkles in the entire study group. The best results are visible for serum with retinal. No effect was observed for retinol.

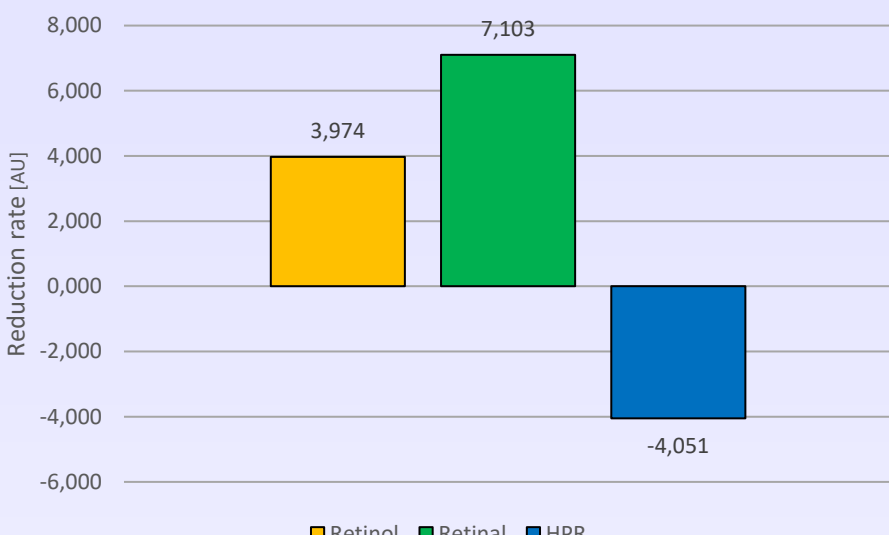


Figure 3. Instrumental measurement of the number of spots in the entire study group. The best results are visible for serum with HPR. No effect was observed for retinol and retinal.

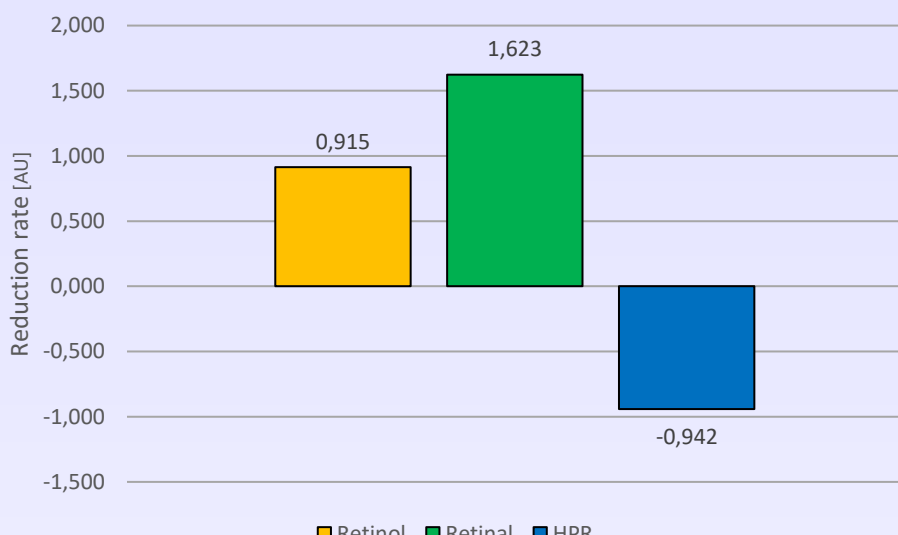


Figure 4. Instrumental measurement of the intensity of spots in the entire study group. The best results are visible for serum with HPR. No effect was observed for retinol and retinal.

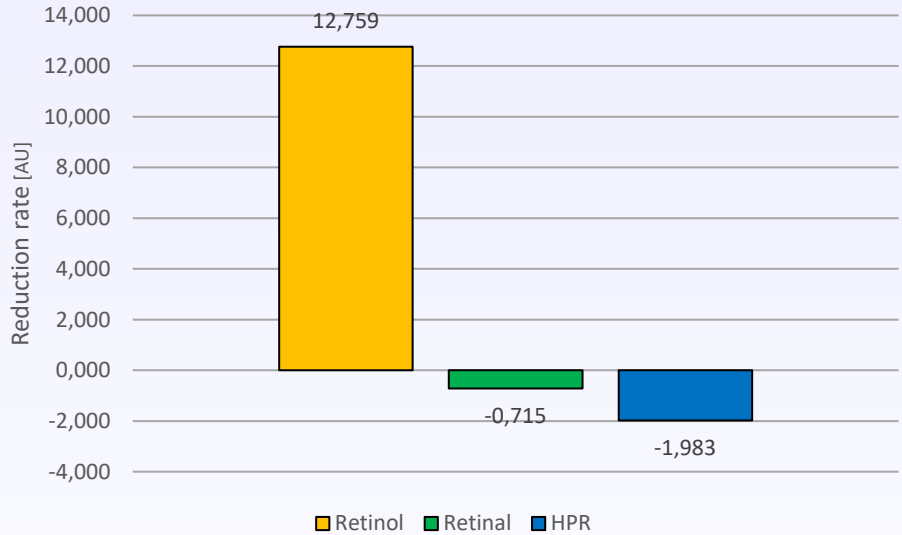


Figure 5. Instrumental measurement of the intensity of UV spots in the entire study group. The best results are vble for serum with retinol. No effect was observed for retinal and HPR.

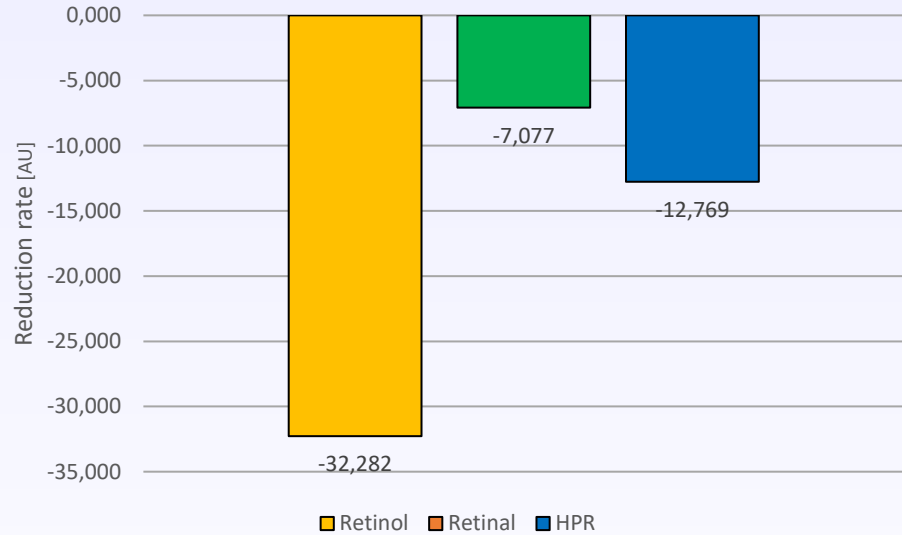


Figure 6. Instrumental measurement of the number of UV spots in the entire study group. The best results are visible for serum with retinol.

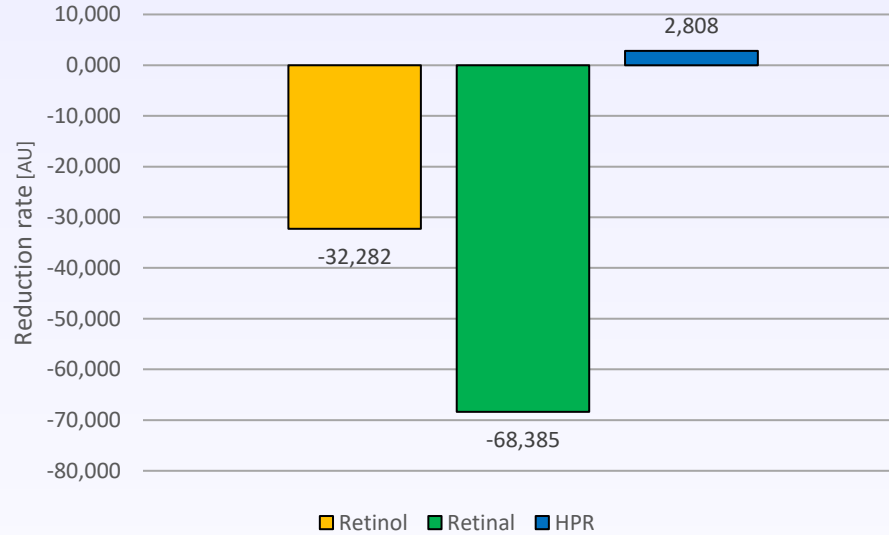


Figure 7. Instrumental measurement the number of skin irregularities in the entire study group. The best results are visible for serum with retinal. No effect was observed for HPR.

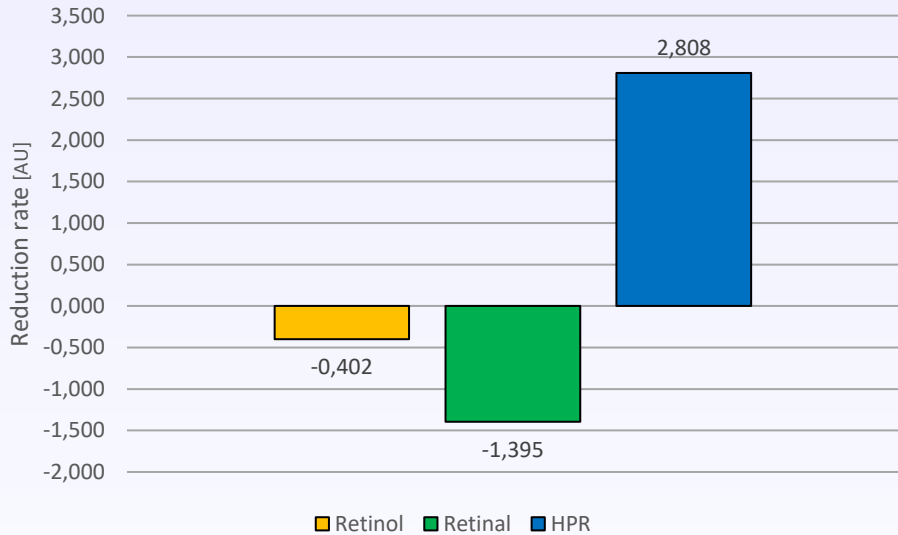


Figure 8. Instrumental measurement of the intensity of skin unevenness in the entire study group. The best results are visible for serum with HPR. No effect was observed for retinol and retinal.

The following tests were performed with the VISIOSCAN device

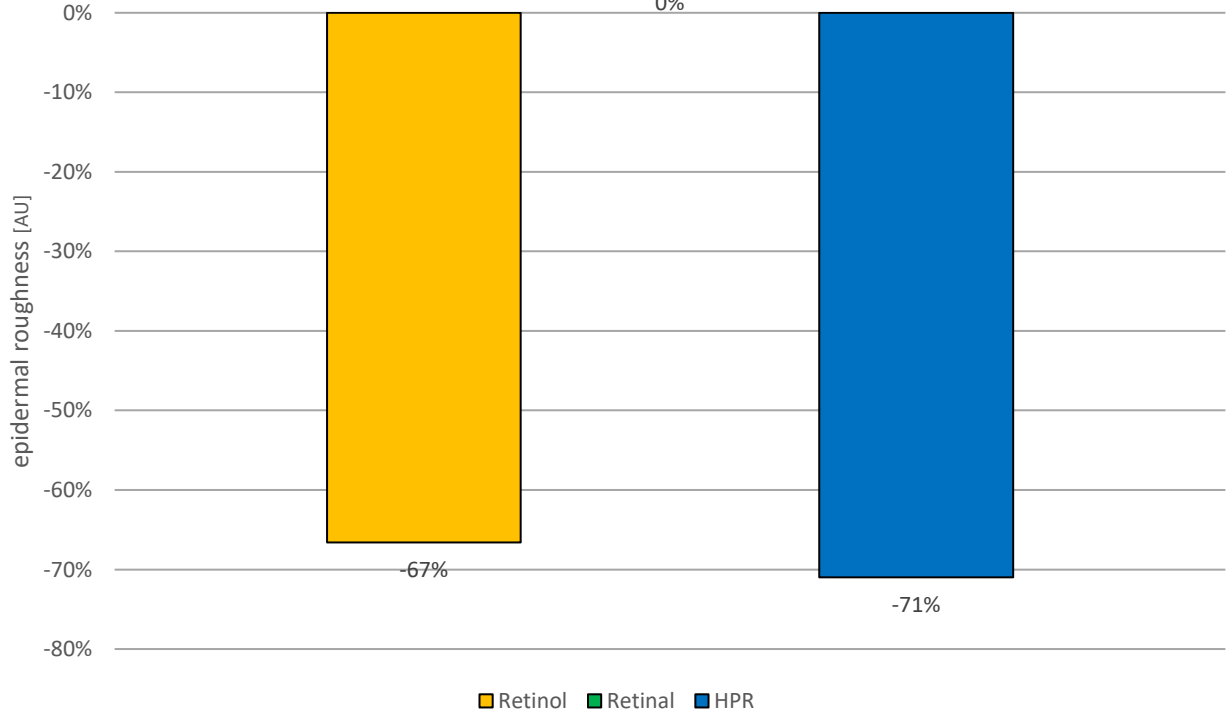


Figure 9. Instrumental measurement of epidermal roughness. The best results are visible for serum with HPR. No effect was observed for retinal.

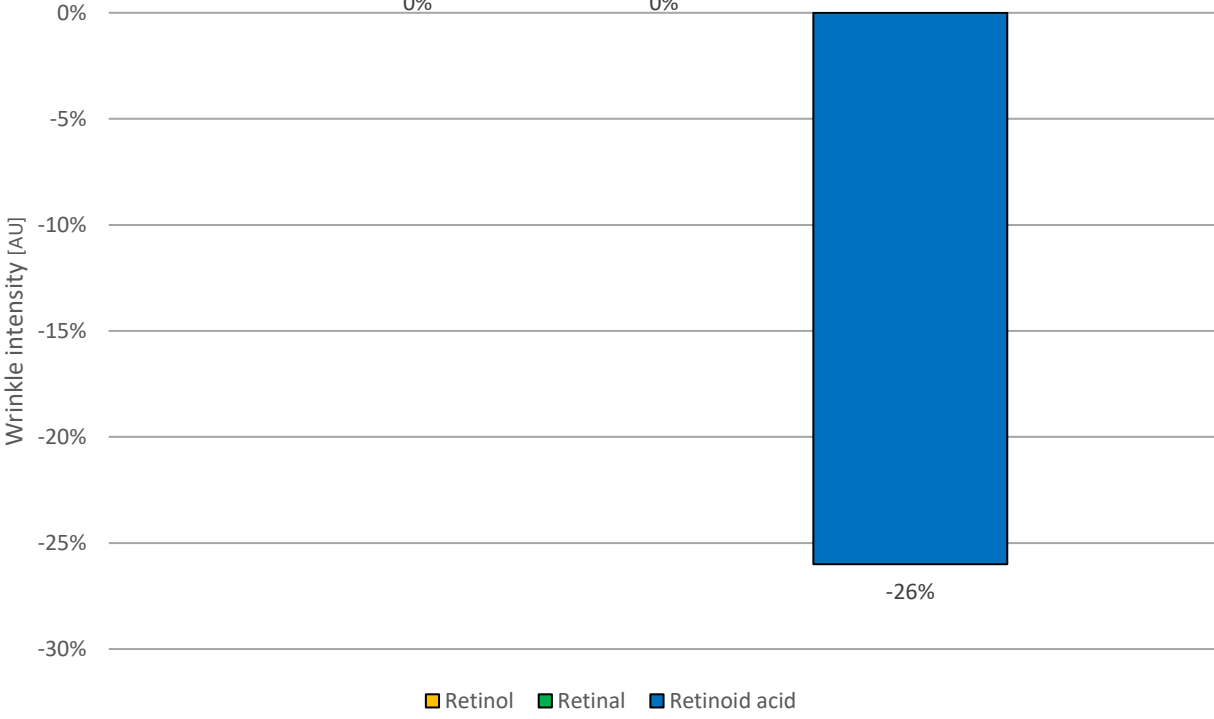


Figure 10. Instrumental measurement of smoothness (wrinkles). The best results are visible for serum with HPR.No effect was observed for retinol and retinal.

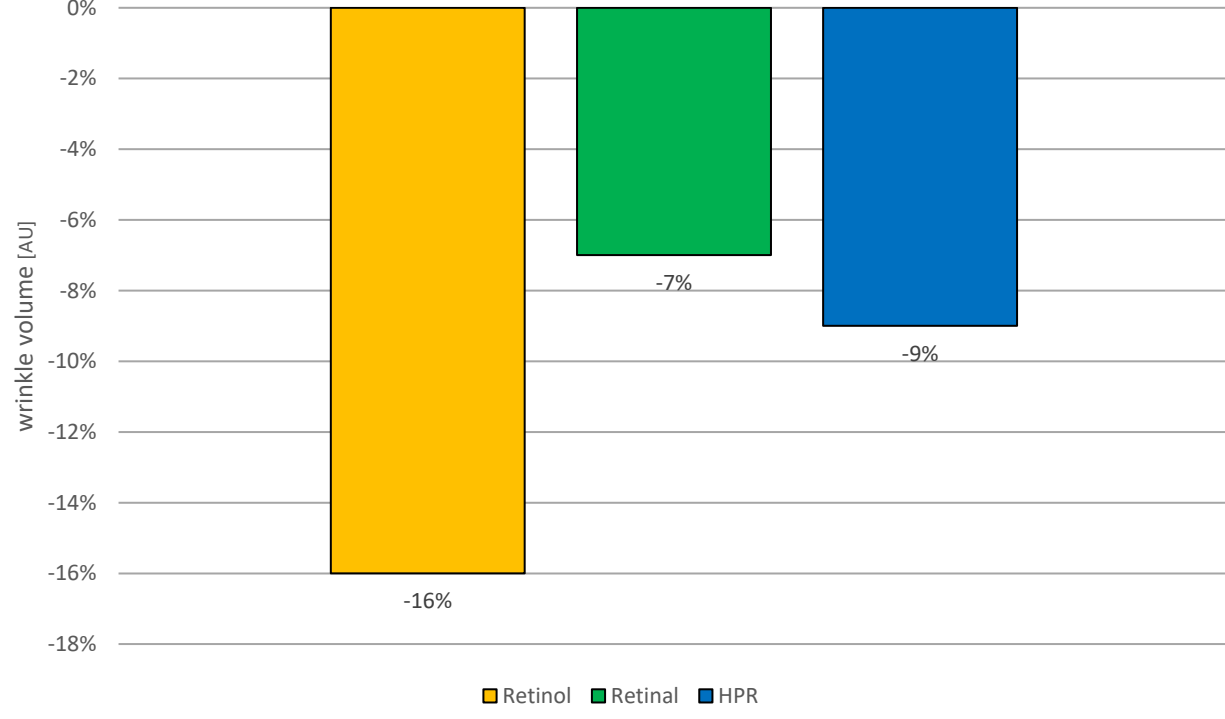


Figure 11. Instrumental measurement of smoothness (wrinkle volume). The best results are visible for serum with retinol.

The following tests were performed with the Cutometer device

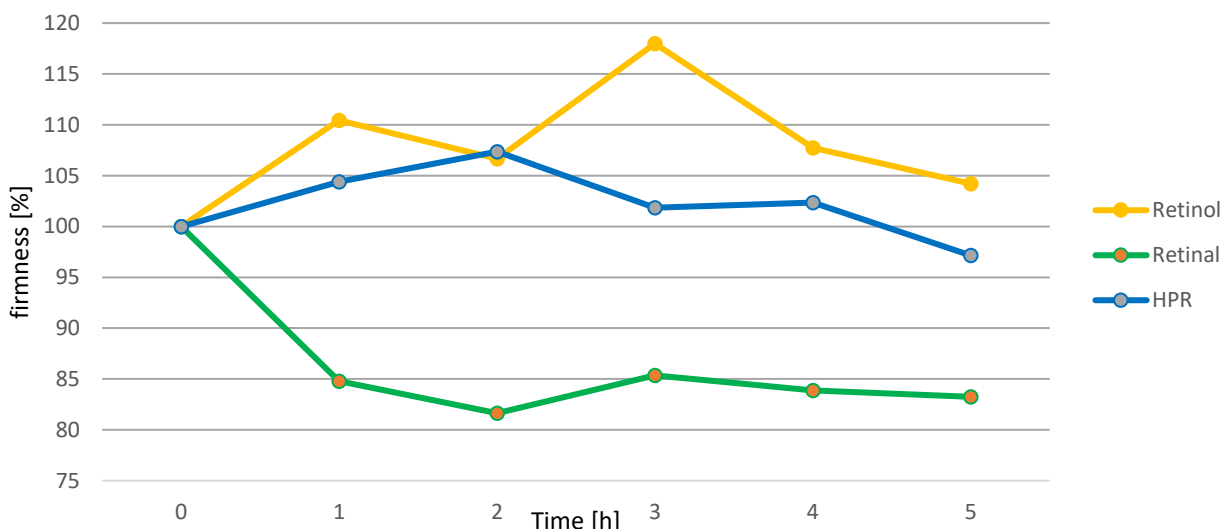


Figure 12. Instrumental measurement of firmness for 5 consecutive hours after single application. The best results are visible for serum with retinol.

CONCLUSIONS

This study underscores the unique strengths of each retinoid formulation. Retinol was most effective for reducing epidermal roughness and wrinkle volume, retinal excelled in targeting dynamic wrinkles such as nasolabial folds, and HPR provided superior hydration, UV spot reduction, and participant satisfaction. The HPR serum's subjective ratings of smoothness, tone improvement, and elasticity enhancement emphasize its potential as a holistic anti-aging treatment. These findings support tailored retinoid use based on individual skin concerns and preferences, further validating their versatility in anti-aging regimens.

SIGNIFICANCE

The results of this study carry significant implications for the practice of aesthetic medicine, particularly in guiding the integration of topical retinoids into personalized anti-aging treatment regimens. The findings highlight both the objective and subjective benefits of retinol, retinal, and hydroxypinacolone retinoate (HPR), offering valuable insights for clinicians in the field. The study reinforces the critical role of topical retinoids in aesthetic medicine by demonstrating their efficacy in improving multiple skin parameters and their potential to enhance patient satisfaction. These findings support the evolution of aesthetic practice toward comprehensive, patient-focused care.