

Synergy effect of 4D-hyaluronic acid and γ -neoPGA acid in skin care products.

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INTRODUCTION

Moisturizing the skin is the basic function of a care product. It's crucial, that this effect is achieved shortly after application and lasts for many hours after using the cosmetic product. The aim of this study was to evaluate a moisturizing synergy of two ingredients: 4D-hyaluronic acid HA (Sodium Acetylated Hyaluronate, Sodium Hyaluronate, Sodium Hyaluronate Crosspolymer, Hydrolyzed Sodium Hyaluronate) and mesoporous calcium phosphate γ -Polyglutamic Acid (γ -neoPGA).

MATERIALS AND METHODS

In preliminary step, *in vivo* evaluation of cosmetic emulsions with 1%, 2%, 3% separate ingredients or their complexes in the group of 5 volunteers aged 23 to 43 years was performed. Measurements (moisturization, transepidermal water loss, skin roughness and smoothness) were taken before and in each hour, up to 5 hours after cream application. Synergy effect was calculated using Kull's equation. Instrumental skin evaluation (moisturization and smoothness) were taken at the baseline and after 3 weeks of product usage (serum no 16013 with selected 4D-hyaluronic acid and γ - neo PGA concentrations) in a group of 23 volunteers (aged 23-55 years old) with sensitive or allergic skin. Subjective analysis was performed based on survey data.

RESULTS

The preliminary *in vivo* tests showed synergy for combination of 2% of 4D-hyaluronic acid and 2% γ -neoPGA. A synergy effect occurred in the case of change in skin hydration, TEWL and roughness reduction.

Objective measurements obtained after serum 16013 usage showed improvement in skin moisturization, elasticity and skin smoothness as well as reduction in number of wrinkles and transepidermal water loss. Moreover, all volunteers self-reported soothing, calming, moisturization and firming effect.

Preliminary *in vivo* study



CONCLUSION

Combination of 4D-hyaluronic acid and γ -neoPGA displayed synergy in hydration properties as well as in the TEWL and skin roughness reduction. It has also calming and soothing effect when applied on sensitive skin.

In vivo study of serum no.16013

Table 1. Instrumental evaluation of skin condition before and after 3 weeks test of product usage. Skin parameters measured: moisturization- Corneometer CM 825, elasticity- Cutometer Dual MPA 580; Sesm, Sew and Surface topography parameters – Visioscan VC 20 plus. All measured skin parameters improved.

Skin parameter	Results
Sesm – smootheness with moisturisation	Improvement by 38% in 64% of volunteers and for whole group by 6%
Sew - wrinkles	Reduction in by 38% in 55% of volunteers and for whole group by 3%
Surface – level of skin smoothness	Improvement by 12% in 64% of volunteers and for whole group by 6%
Moisturization	Improvement by 48% in 64% of volunteers and for whole group by 10%
Elasticity	Improvement by 11% in 64% of volunteers and for whole group by 2%

Table 2. Volunteers self-assessment taken after 3 weeks of tested product usage. Self- assessment taken by volunteers confirmed, that tested serum made skin look healthy, silky to the touch, firmed and intensively moisturized. Moreover volunteers noticed improvement in skin smoothness and elasticity as well as they observed soothing effect. Wrinkles become less visible. Serum restored skin comfort

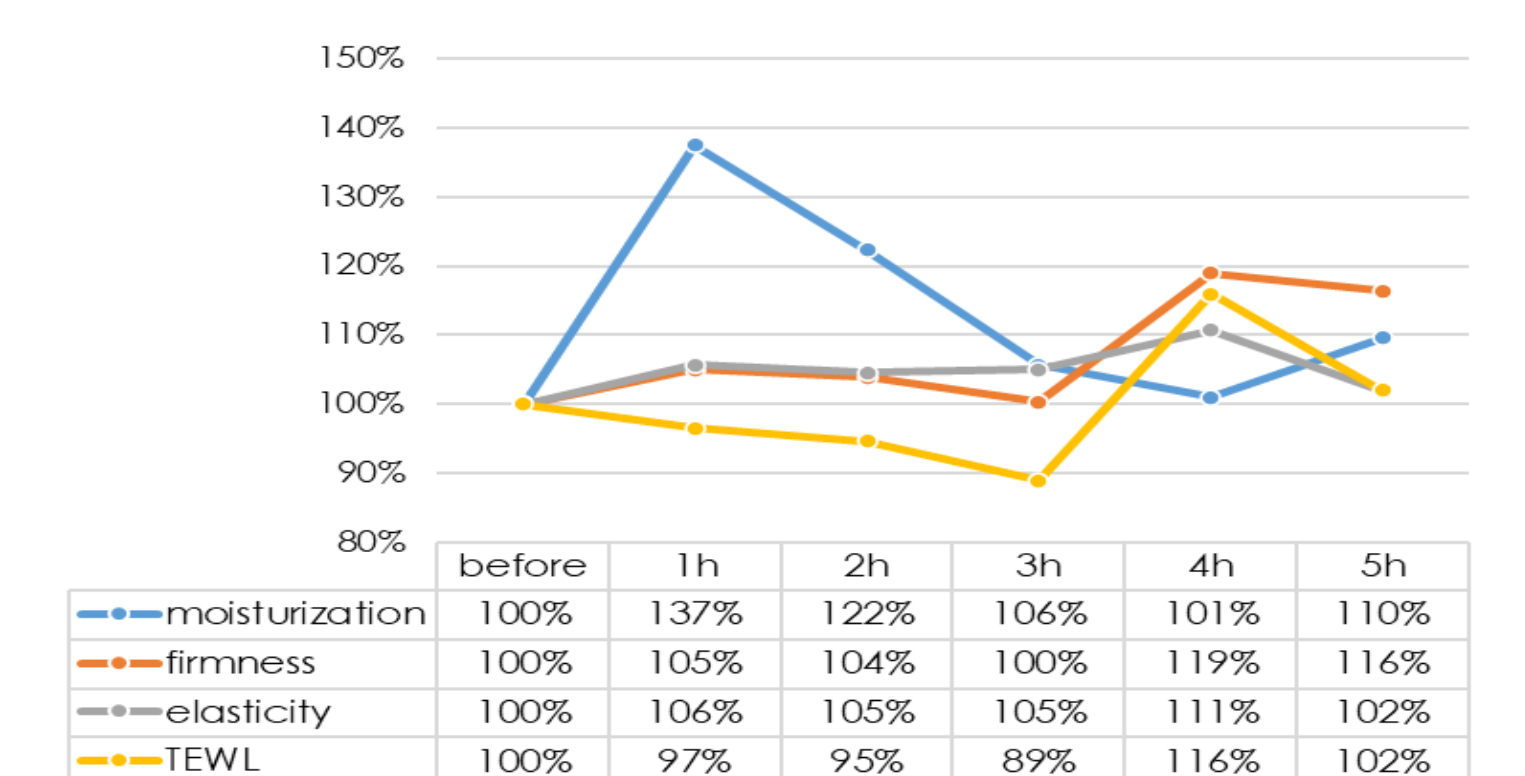
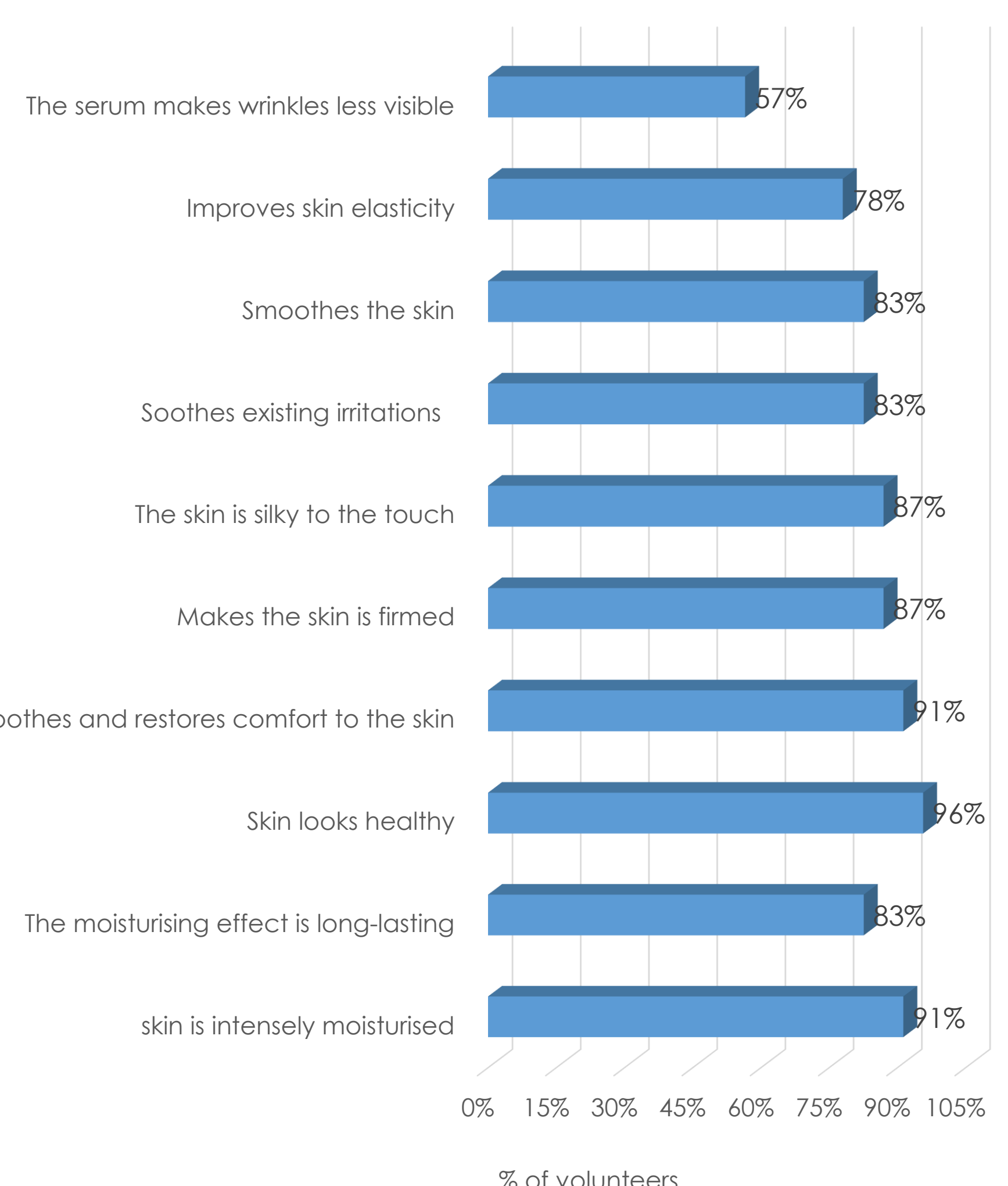


Figure 9. Instrumental measurement of skin condition after single usage of serum (within 6 hours) showed long lasting improvement in moisturisation, firmness, elasticity and TEWL reduction.

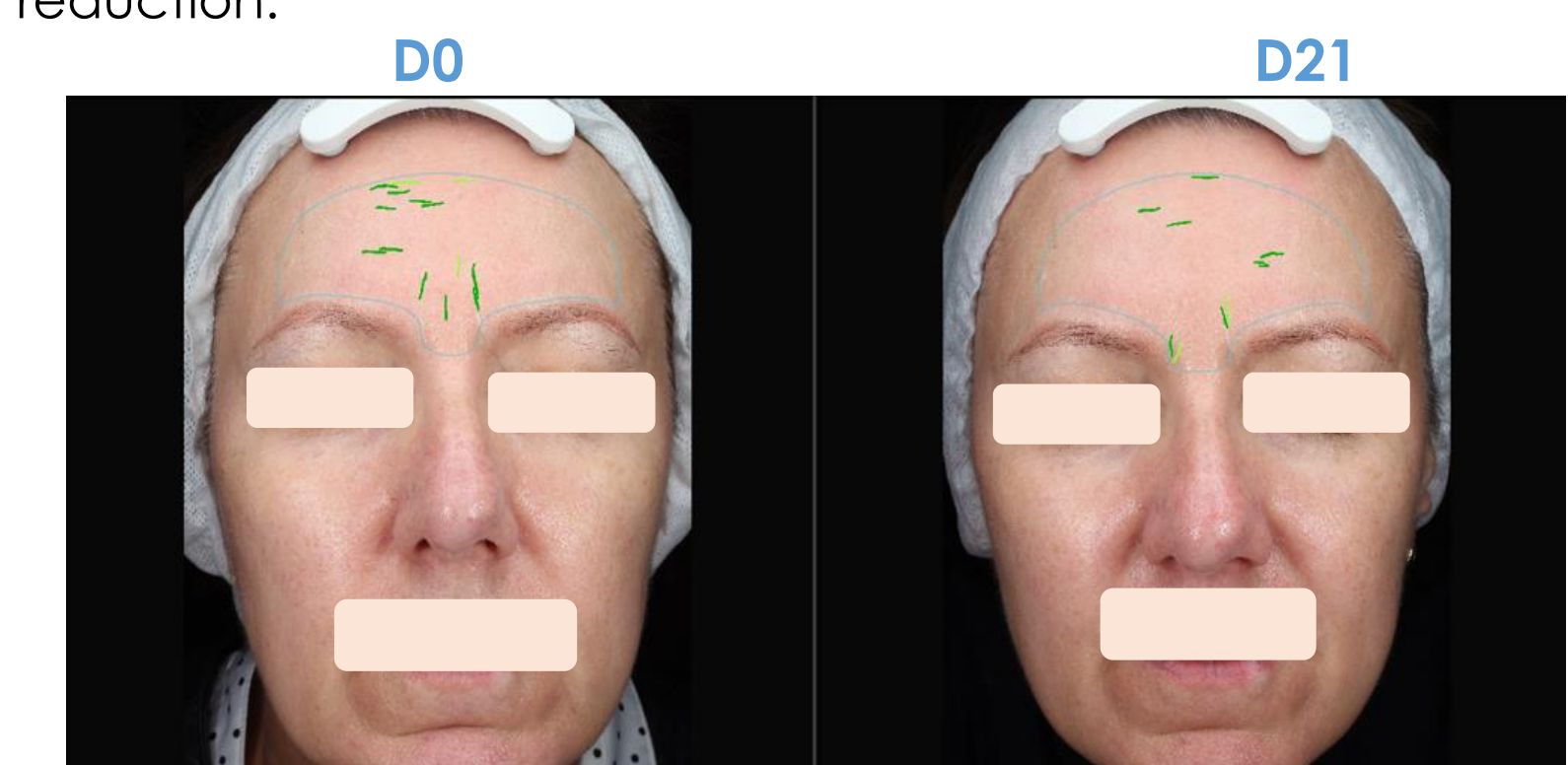


Figure 8. Female subject (age 43). Instrumental analysis showed the reduction in numbers and volume of wrinkles (by 36% and 44%, respectively) after 3 weeks of serum application.



Figure 9. Female subject (age 50). Instrumental analysis showed the reduction in numbers and volume of wrinkles (by 21% and 29%, respectively) after 3 weeks of serum application.

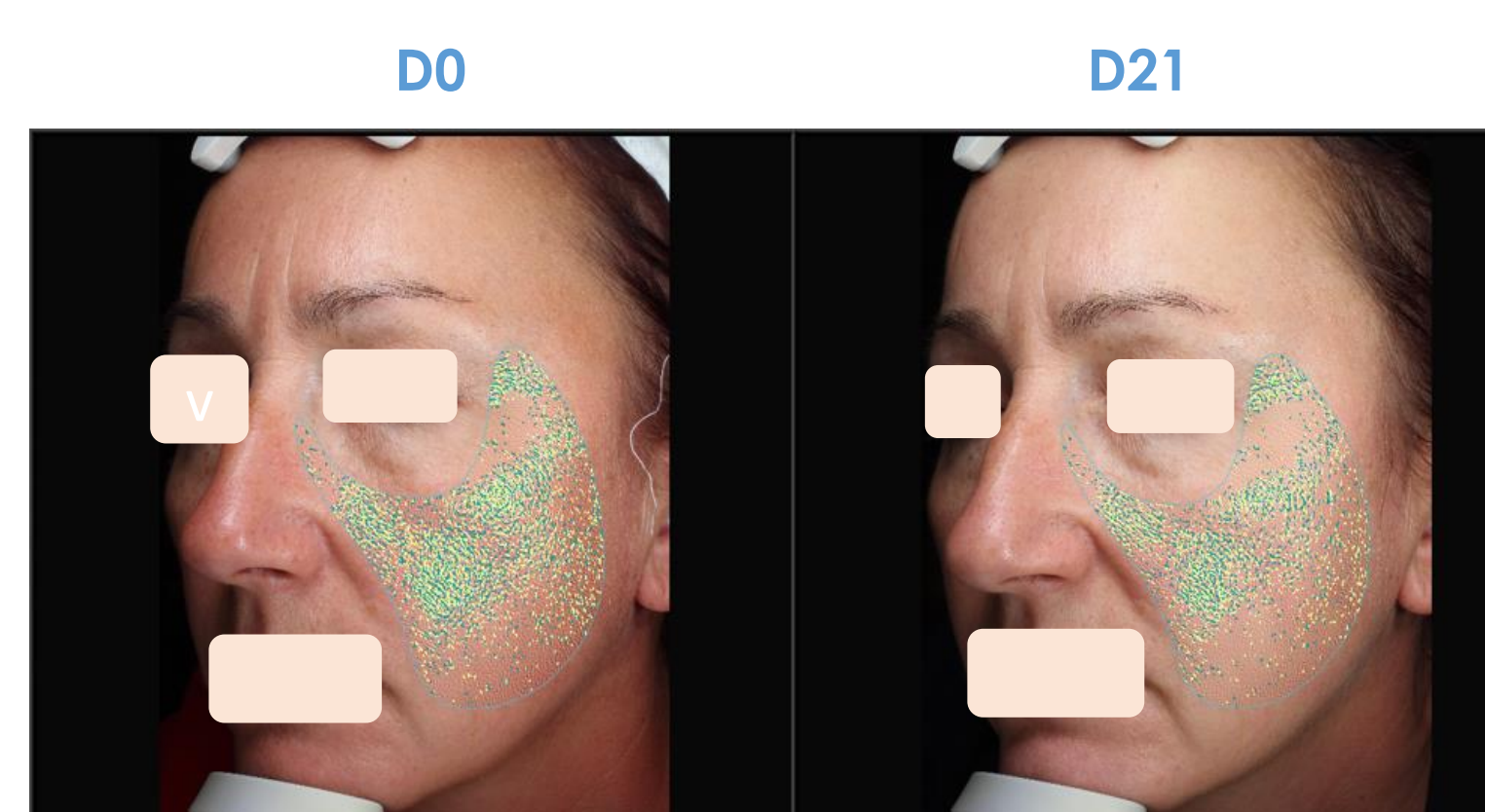


Figure 10. Female subject (age 46). Instrumental analysis showed the reduction in numbers and volume of unevenness by 25% and by 29%, respectively after 3 weeks of serum application.