

Combination of two plant flavonoids - magnolol and honokiol as a tyrosinase inhibitor for sensitive uneven skin care

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Introduction

Tyrosinase is a key enzyme in melanin formation. Its inhibition is a crucial step for hyperpigmentation reduction. Magnolol and honokiol (extracted from the bark of *Magnolia officinalis*) are known from strong antioxidant and anti-inflammatory activity. The aim of this study was to evaluate the efficacy of magnolol and honokiol complex in novel delivery system (MaHo) on tyrosinase inhibition as well as their whitening and anti-aging properties in group of panelist with sensitive skin.

Methods

Tyrosinase inhibitory activity was conducted spectrophotometrically *in vitro*. Substances, in several concentrations, were tested: MaHo (powder), MaHo in delivery system, placebo (delivery system).

Preliminary *in vivo* test was performed on emulsion with 1% MaHo in the delivery system in group of 14 female volunteers with sensitive skin (aged 41-70 y. o.). All the participants applied product on face area, twice a day for 4 weeks. Measurements were taken at the baseline and after 4 weeks of product application. Instrumental skin evaluation of melanin content and erythema (Mexameter) were performed. In addition, a self-evaluation questionnaire was conducted.

Next stage was conducted on serum containing 1% MaHo in delivery system supplemented by squalane, bioceramides, probiotics and heptapeptide on another group of 25 women with sensitive skin (aged 28-69 y. o.). Serum was applied on face area for 3 weeks. All participants completed a satisfaction questionnaire after that time. Among this group, in 13 females, instrumental analysis of skin condition was performed before and after 3 weeks of product usage. In this group, changes in melanin content, elasticity, skin smoothness (Visioscan), number and size of wrinkles and UV spots (Visia) were evaluated.

Results – synergy measurement *in vitro*

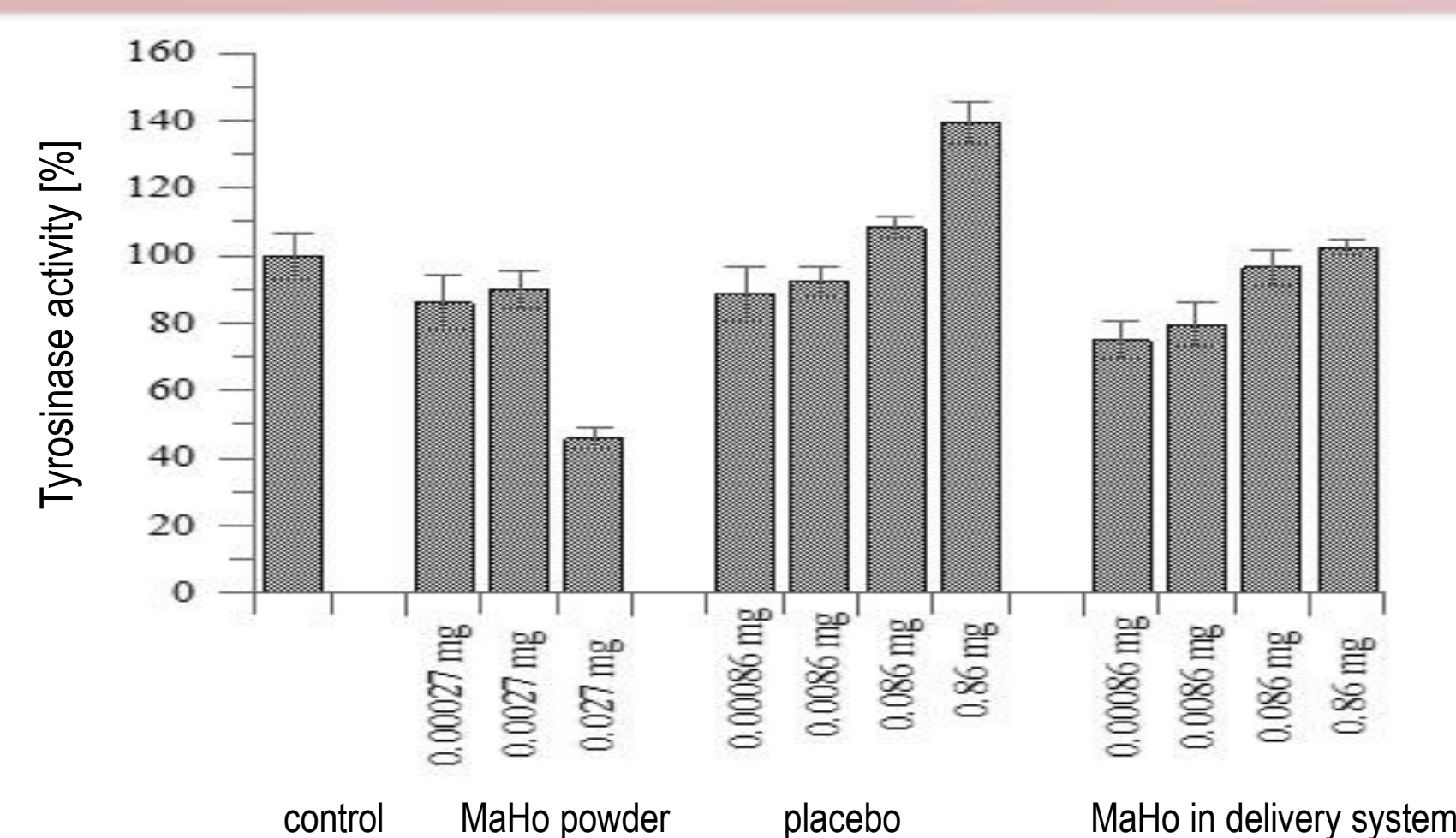


Figure 1. Tyrosinase inhibitory activity tested for several concentrations of: MaHo (powder), MaHo in delivery system, placebo (delivery system). L-DOPA was used as tyrosinase substrate during enzymatic reaction. Measurement of absorbance increase was conducted for 5-6 min in 475 nm. For each sample the rate of change in absorbance per min ($\Delta A/\text{min}$) was measured. Level of inhibition was shown in % by division of $\Delta A/\text{min}$ value obtained for each sample, by $\Delta A/\text{min}$ value obtained for sample without inhibitor. MaHo (powder) showed inhibitory activity at a concentration 0,027mg/290 μ l of the measurement buffer (enzyme activity inhibited up to 46%). Inhibition of tyrosinase in case of MaHo in delivery system was detected at low concentration (enzyme activity inhibited up to 75% at a concentration of 0,00086 mg/290 μ l)*. No inhibitory activity of placebo was detected.

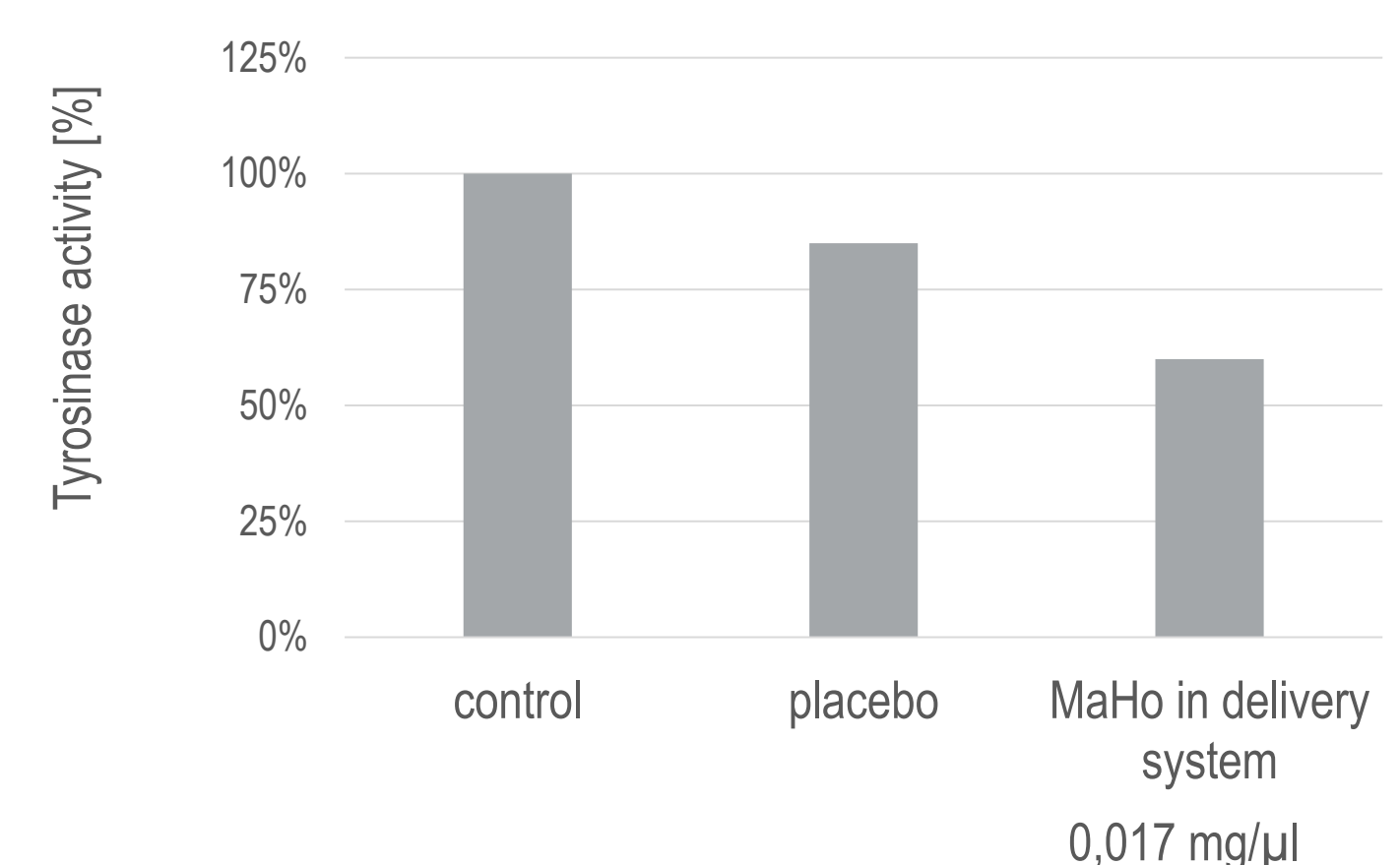


Figure 2. Activity of tyrosinase conducted spectrophotometrically. MaHo in delivery system has inhibitory effects – enzyme activity inhibited up to 63% at the concentration of 0,017 mg/ μ l. Placebo shows lower inhibitory effects (up to 81%) at the same concentration.

* In case of MaHo in delivery system and placebo, the increase of absorbance in higher concentrations can be detected. It can be due to turbidity of solution (problems with solubility). It is rather not enzyme activation, due to allosteric interactions.

Conclusion

Novel combination of active ingredients (magnolol and honokiol in delivery system) used in tested cosmetic formulations showed very good properties in case of whitening, anti-aging as well as calming effect on sensitive skin with uneven skin tone.

Results – preliminary *in vivo* test on emulsion with 1% MaHo

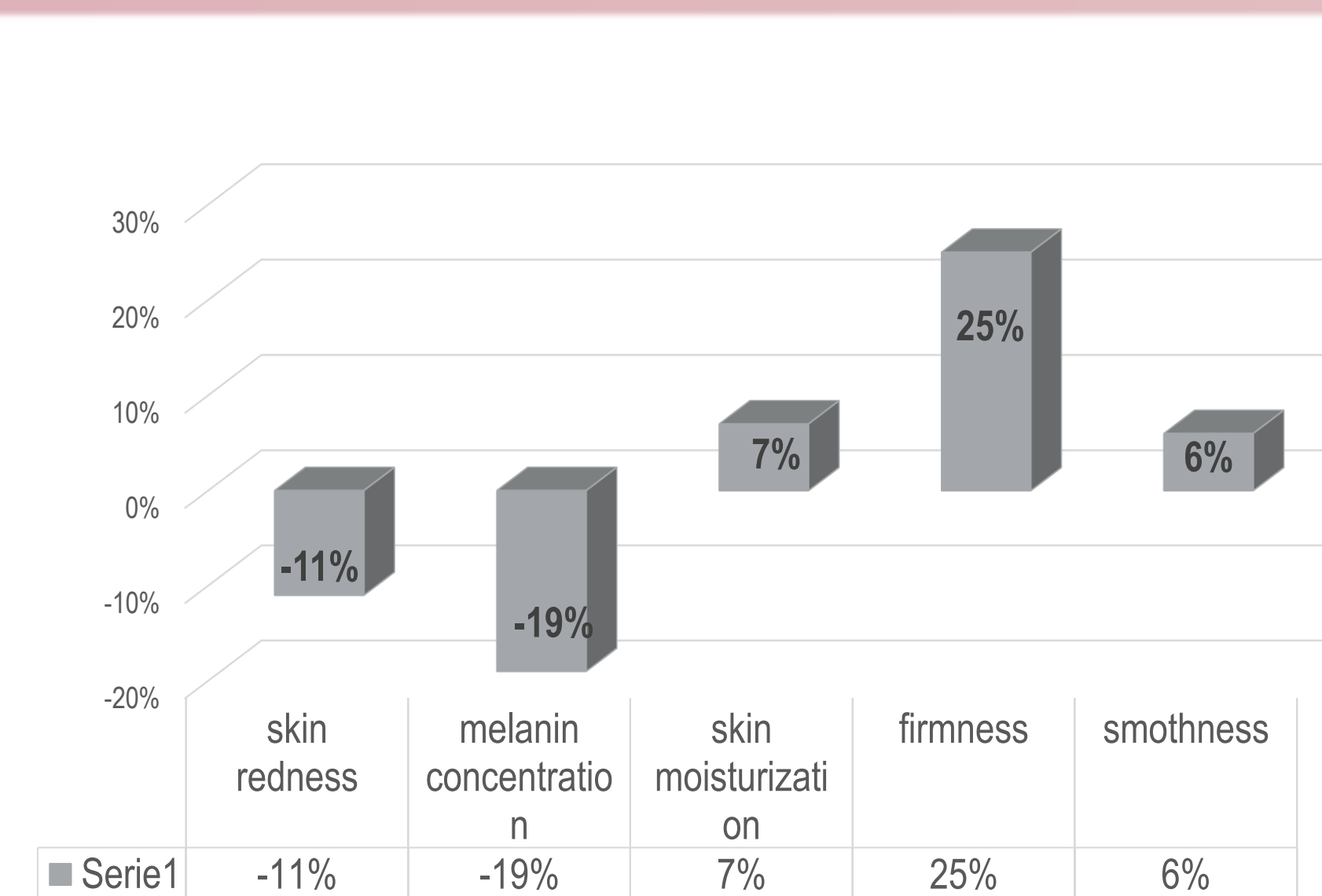


Figure 3. Instrumental skin analysis taken at baseline (before application) and after 4 weeks of using tested product (preliminary test, n=14).

Biometric measurements showed an improvement in skin firmness by 25%, moisturization by 7% and smoothness by 6%. Skin redness was reduced by 11% and melanin concentration decreased by 19%.

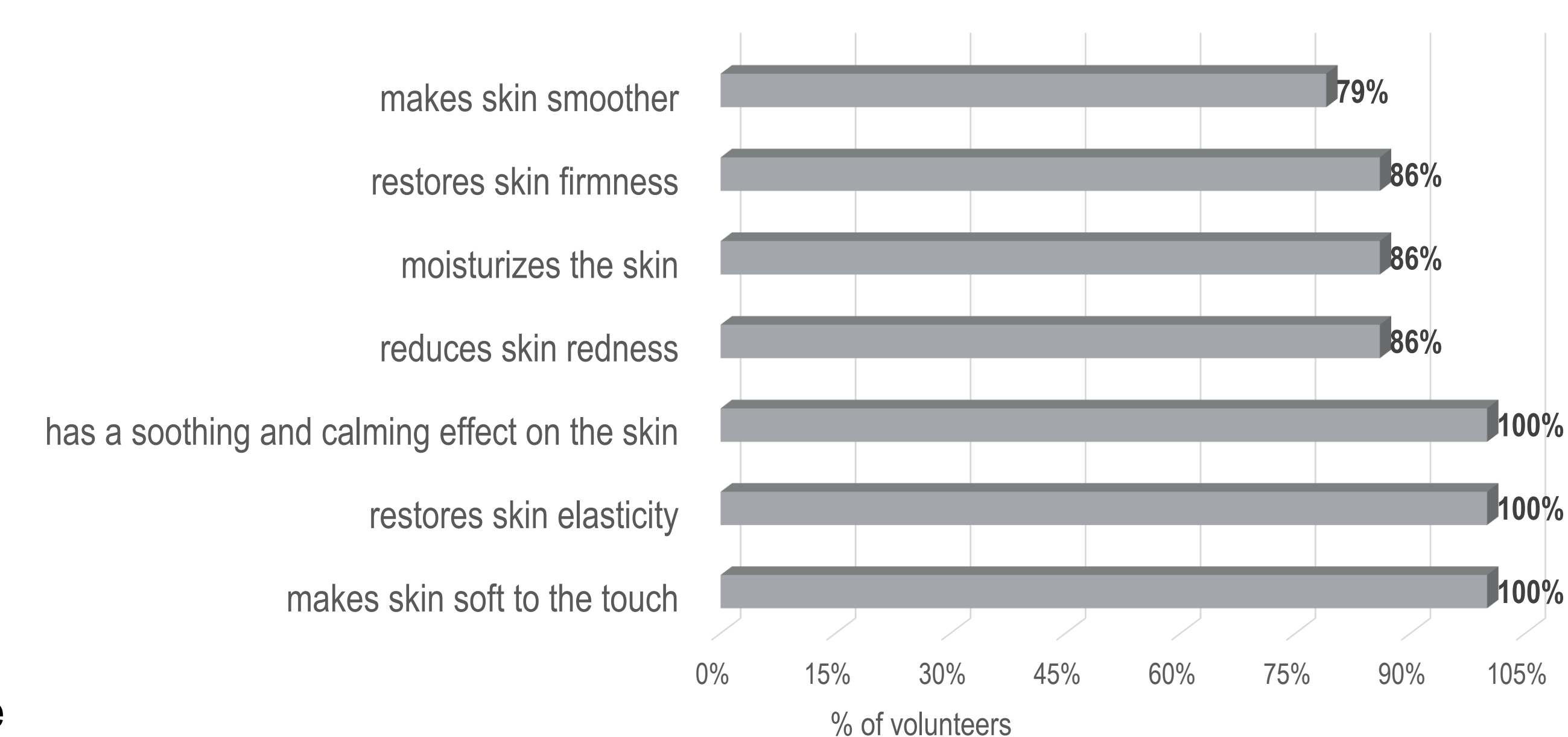


Figure 4. Volunteers self-assessment taken after 4 weeks of tested product usage confirmed, that emulsion made skin soft to the touch, restored skin elasticity, had a soothing and calming effect of the skin (100%).

Moreover volunteers noticed an improvement in skin moisturization and firmness (86%) as well as smoothness (79%). They also observed the decrease in skin redness (86%).

Results – evaluation of efficacy of serum no. 2584 with 1% MaHo

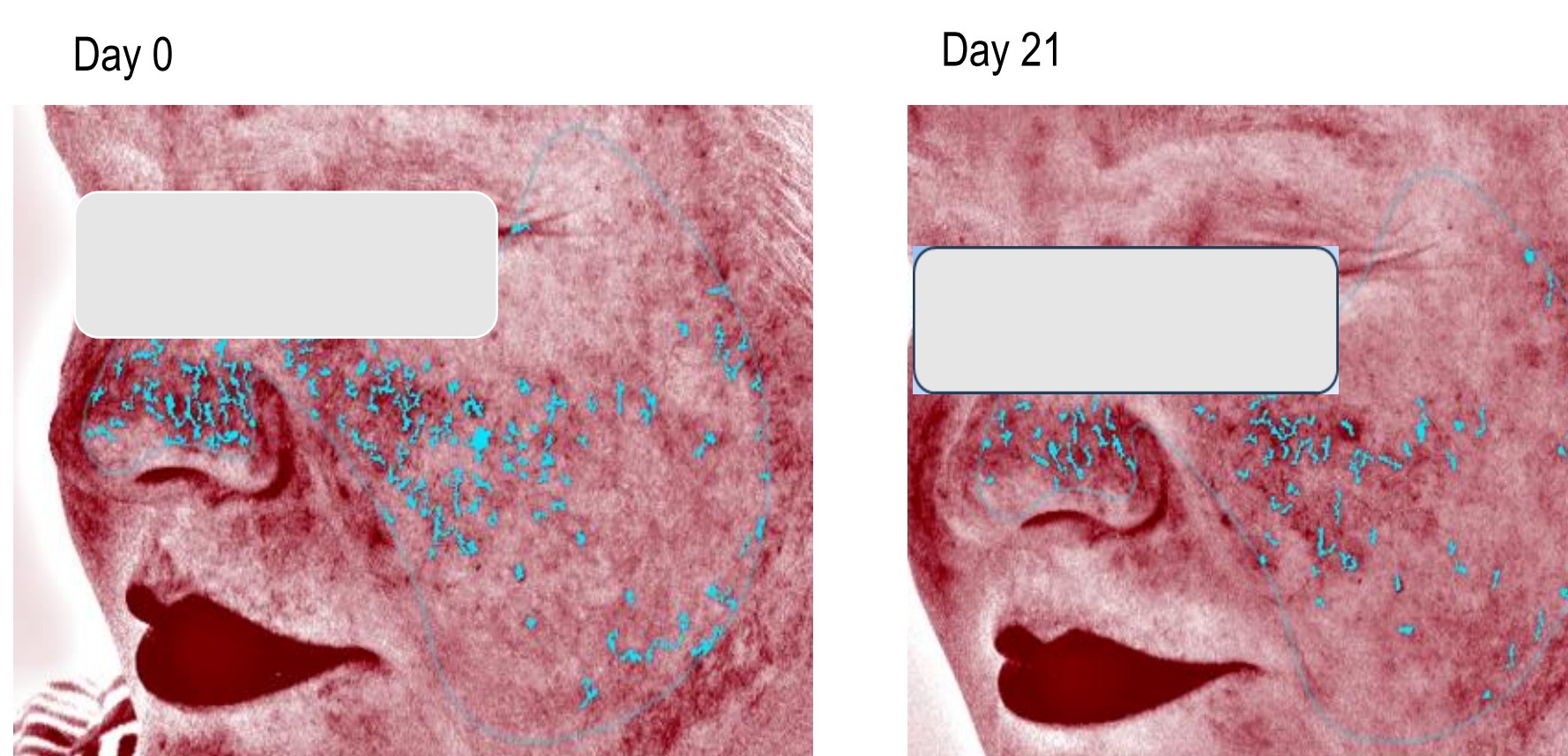


Figure 5. Female subject (age 45). Instrumental analysis showed the reduction in skin redness by 21% and reduction in number of dilated capillaries by 42% after 3 weeks of serum application.

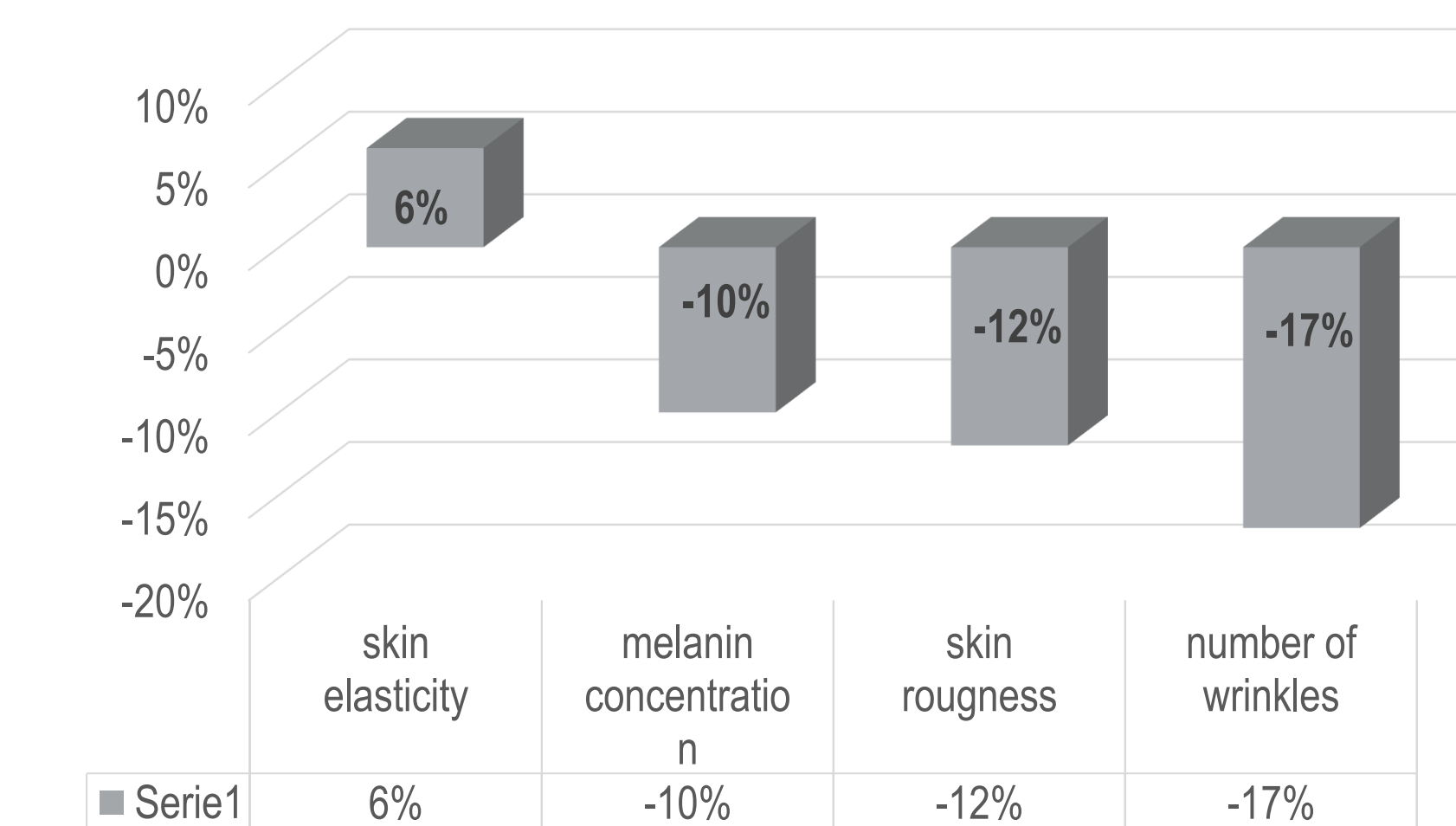


Figure 7. Instrumental skin analysis taken at baseline (before application) and after 3 weeks of using tested serum no. 2584 (n=13).

Biometric measurements showed decrease in melanin concentration by 10%, skin roughness by 12% and number of wrinkles by 17%. Skin elasticity was improved by 6%.



Figure 6. Female subject (age 49). Instrumental analysis showed the reduction in numbers and volume of wrinkles (by 47% and 44% respectively) after 3 weeks of serum application.

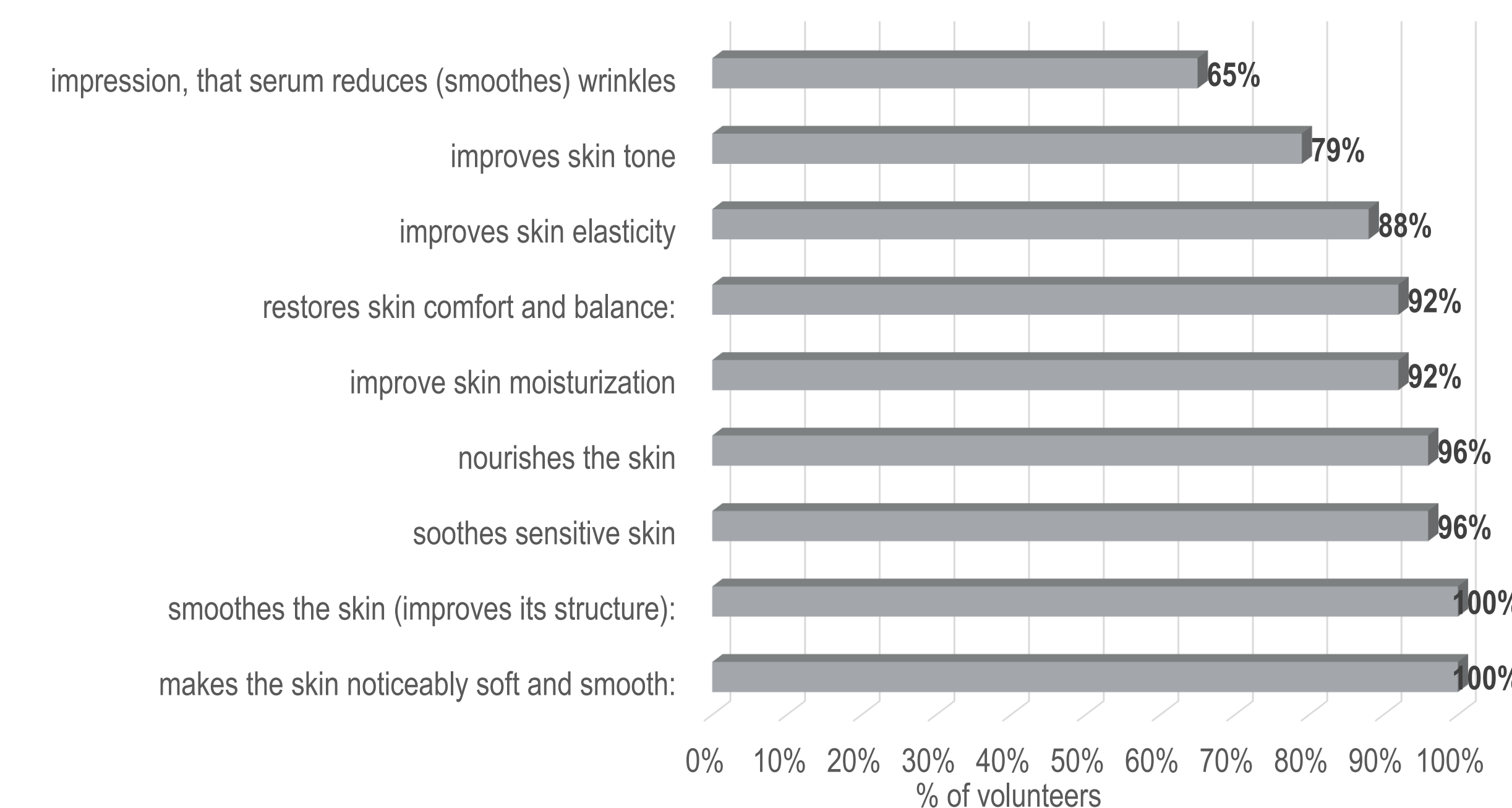


Figure 8. Volunteers self-assessment taken after 3 weeks of usage of serum no. 2584 confirmed, that the tested product made skin noticeably soft and smooth (100%), soothed sensitive skin and nourished the skin (96%), improved skin moisturization and restored skin comfort and balance (92%), improved skin elasticity and skin tone (88% and 79% respectively).