

Solid Vitamin C derivative based cosmeceutic to treat signs of photoaging: development challenges and clinical efficacy

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INTRODUCTION

Pure vitamin C is a reference active for topical application due to its multiple benefits to the skin: high antioxidant activity, increase luminosity, lightening effect, wrinkle reduction and improvement of collagen synthesis. However, for formulators, ascorbic acid stability is still a challenge. The use of vitamin C derivatives has been suggested as a solution for topical applications, also the development of stable solid vehicles, with low concentrations of water, would be an opportunity. In this context, Sodium Ascorbyl Phosphate presents similar molecular structure with ascorbic acid and could be applied in solid cosmeceutical for antiaging propose.

OBJECTIVE

The aim of this study was to develop and evaluating the efficacy of a solid cosmetic formula containing Sodium Ascorbyl Phosphate to improve signs of photoaging.

METHODS

A solid cosmetic based on Sodium Ascorbyl Phosphate in association with other antioxidants (Ferulic Acid, Vitamin E, Astaxanthin) and a natural exfoliant was submitted to stability under thermic stress (5, 25, 45°C) test and the amount of Vitamin C was evaluated before and after 30, 60 and 90 days, by high pressure liquid chromatography (HPLC). In a clinical trial, the formula was applied to 23 volunteers twice a day for 56 days. Before and after 28 and 56 days of treatment, deeper hydration, elasticity and firmness were evaluated. This analysis was performed by applying a deformation force to the skin and considering the parameters U_v (viscoelastic deformation), U_e (elastic deformation) and U_f (maximum deformation). Assessment of wrinkles, dark spots and skin radiance were performed by image analysis after 28 days of using the formula. Comedogenicity was evaluated in a clinical study with comedone counting using a magnifying glass and white fluorescent lighting.

RESULTS

Solid cosmetic containing vitamin C derivative behaved with very high stability during the stress test (Figure 1).

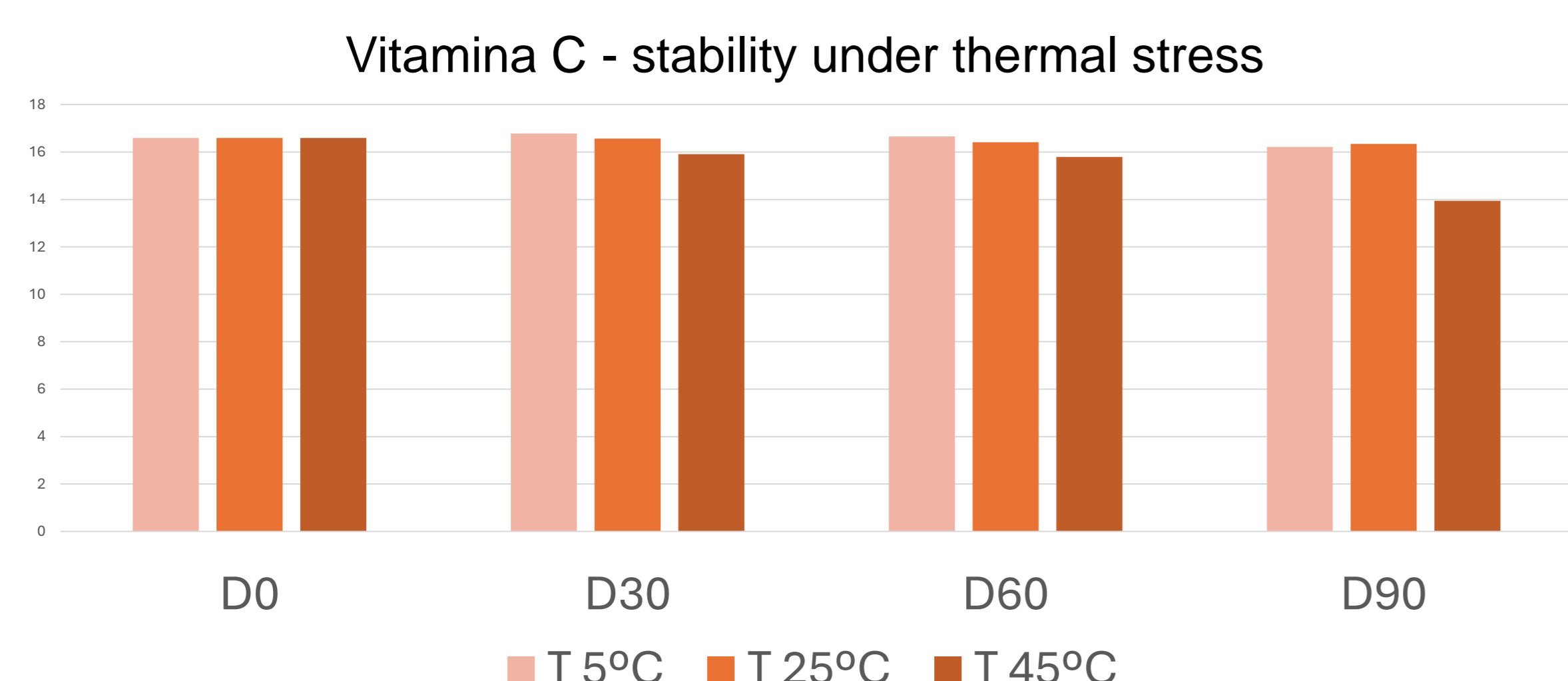


Fig. 1. HPLC assay of Sodium Ascorbyl Phosphate for 90 days under thermic stress

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After 28 and 56 days of use, the formula studied increased firmness by 11.2% and 17.4%, elasticity by 15% and 19.1%, and deeper hydration skin by 14% and 22.8%, respectively (Figure 2). The results were statistically significant ($p < 0,05$).

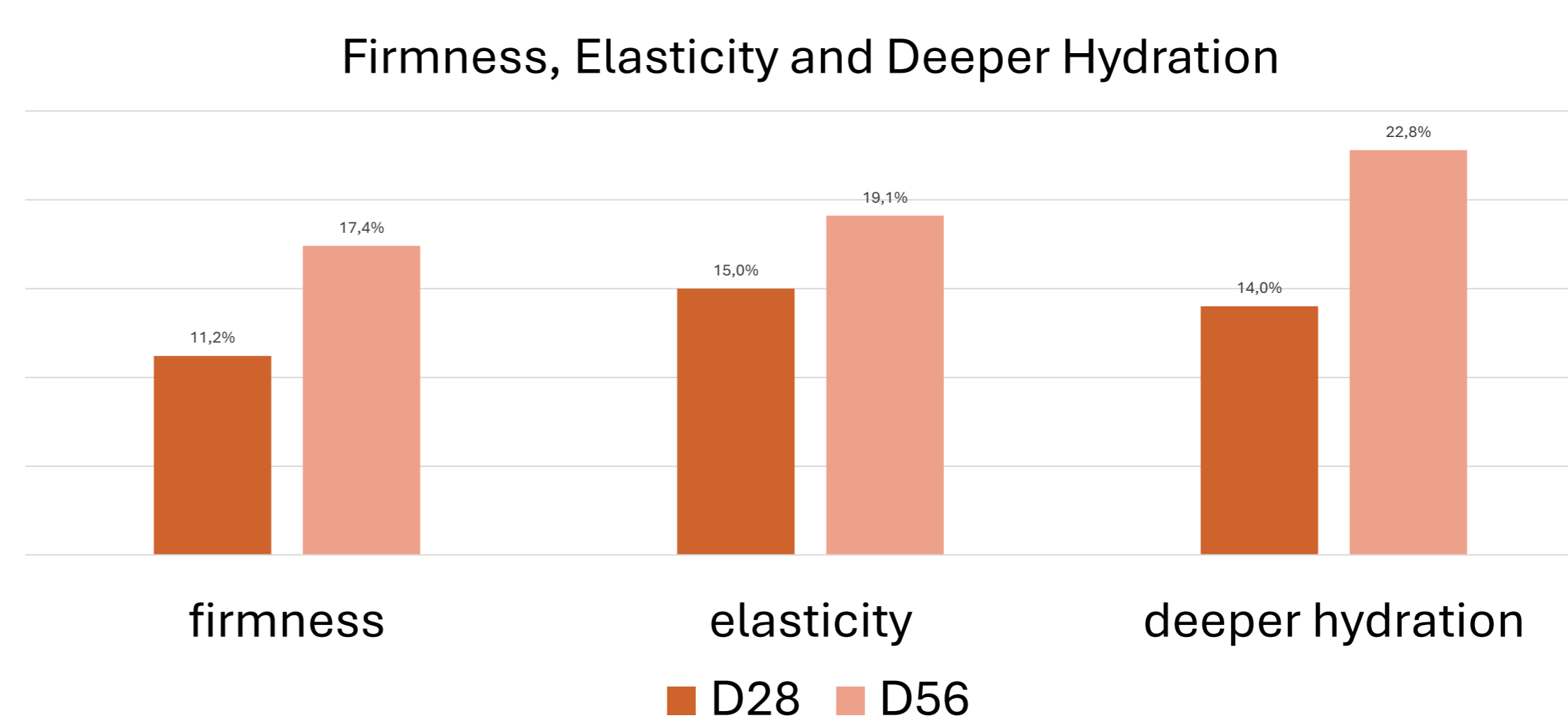


Fig. 2. Instrumental evaluation of skin firmness, elasticity and deep hydration after 28 and 56 days of using the formula.

Image analysis showed reduced wrinkles and dark spots, in addition to increased radiance (Figure 3). The formula was not comedogenic.

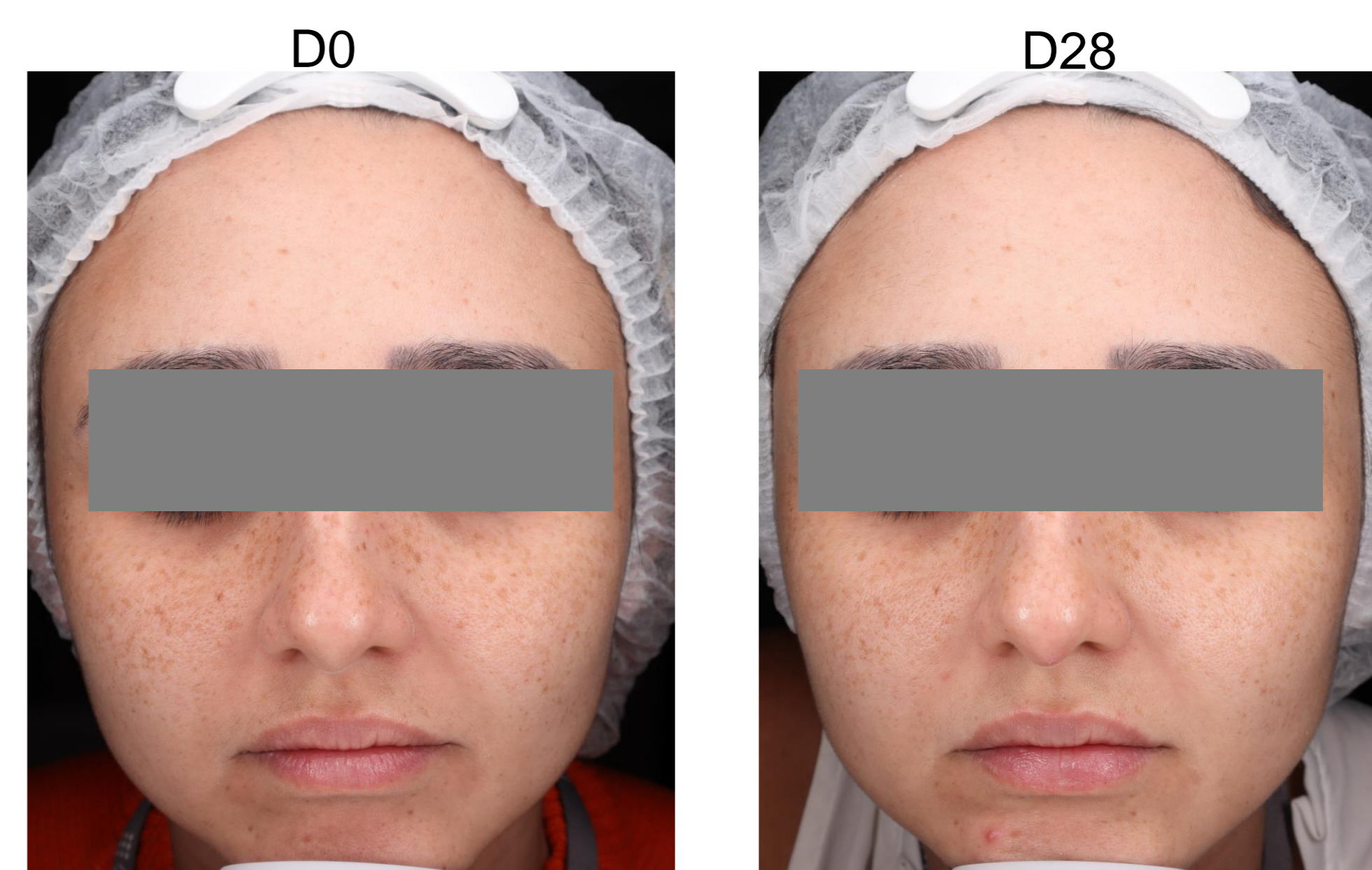


Fig. 3. Image of a volunteer before and after 28 days of using the product, showing increased radiance and reduction of dark spots.

DISCUSSION

The solid cosmetic containing vitamin C derivative was stable during the stress test and the concentrations of the active ingredient were preserved throughout the study period, showing that the formula was able to stabilize vitamin C. The formula studied was able to significantly increase deeper hydration, firmness and elasticity of the skin after 28 and 56 days of use. In addition, after 28 days of use, the formula visibly increased radiance, reduced wrinkles and dark spots on the skin. These results demonstrate that the solid cosmeceutical was able to stabilize the combination of antioxidant active ingredients, including Sodium Ascorbyl Phosphate, and presented clinical efficacy similar to ascorbic acid, treating signs of photoaging.

CONCLUSION

This study presents important information about vitamin C application in solid cosmetics formulas, suggesting that it could be a solution to stability issues.

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