

Summary of the paper entitled: "Comparative assessment of the effect of ferulic acid and ferulic acid with microneedling on selected skin parameters".

Ferulic acid is a strong antioxidant of plant origin until recently used synergistically with other antioxidants, i.e. vitamin C, vitamin E, increasing their activity and participating in regeneration. Formulas enriched with ferulic acid gain several times higher antioxidant and photoprotective effectiveness. In this study, we decided to evaluate the effect of ferulic acid in the form of a chemical peel on selected skin parameters: hydration, the level of melanin, erythema severity, skin topography and elasticity. Objective assessment of the effectiveness of cosmetological treatments is an important source of knowledge about the methods used. In order to optimize the possible effects, it was decided to compare the application of ferulic acid alone with a combined treatment involving microneedling preceded by the application of ferulic peeling. A comparison of effectiveness was also made with another commonly used, strong antioxidant - ascorbic acid. In the light of current knowledge, it is known that ferulic acid has a beneficial effect on cell cultures of fibroblasts, keratinocytes, and melanocytes, protecting them from the adverse effects of UV radiation, mainly due to antioxidant properties. However, there is little literature data assessing the effect of ferulic acid on the probants' skin.

The study included 56 probants, with an average age of 54.2 years (range 39-61 years) with visible signs of photoaging, which were divided into 3 groups. All of them underwent a series of 8 treatments at 1-week intervals. 20 probants (Group 1) received treatment sessions with the application of ferulic peeling alone, in 16 probants (Group 2) split-face treatments were performed, involving applying ferulic peeling independently to one half of the face, on the other half of the face - ferulic peeling in combination with microneedling, in 20 others (Group 3) - a split-face treatment applying ferulic peeling to one half of the face, on the other half of the face - a serum with ascorbic acid. The effectiveness of the treatments was assessed using: Mexameter, Korneometer, Cutometer - the probes of MPA - The Multi Probe Adapter Systems (Courage + Khazaka electronic GmbH, Köln, Germany) and the camera - Visioscan® VC 98. Before and after the series of treatments photographic documentation was made with the use of VISIA® Complexion Analysis System (Canfield Scientific, Inc.) and Fotomedicus (Elfo®).

The purpose of this study involves:

- 1) The assessment of the effect of ferulic acid on skin hydration, melanin level, erythema severity, and skin topography and elasticity.
- 2) Comparative assessment of the influence of ferulic acid and ferulic acid with microneedling on selected skin parameters: hydration, melanin level, erythema severity, skin topography, elasticity.
- 3) Comparative assessment of the influence of ferulic acid and vitamin C on selected skin parameters: hydration, melanin level, erythema severity, skin topography, elasticity.
- 4) Evaluation of the effectiveness of the above treatments on the basis of photographic documentation.

The following conclusions are drawn from the study:

- 1) A series of treatments using a chemical peel based on ferulic acid significantly improves skin hydration, lightens hyperpigmentation, reduces erythema, smoothes the surface of the skin, and increases skin elasticity. The improvement persists over time – one month after the end of the series of treatments, the results were still significantly higher compared to the measurement before the therapy.
- 3) The treatment involving the combination of ferulic acid with microneedling gives better therapeutic effects than using ferulic peeling alone.
- 4) The effectiveness of ferulic acid and ascorbic acid in eliminating the symptoms of photoaging of the skin does not differ significantly. Both compounds showed a significant improvement in all tested parameters.
- 5) Photographic documentation confirmed the results obtained in the apparatus assessment – all probands show a significant improvement in the condition of the skin after a series of treatments using ferulic acid.