

STRESZCZENIE W JĘZYKU ANGIELSKIM

Azelaic acid, due to its multidirectional action, is frequently used as an active compound of cosmetics and medicines. This acid has antioxidant, keratolytic, antibacterial, anti-inflammatory, anti-seborrheic and brightening properties. It is produced by yeasts (*Malassezia furfur* and *Pityrosporum ovale*) that live on the skin and in the hair. Moreover, azelaic acid is a natural ingredient found in cereals. Phytic acid is a natural ingredient of plant origin. It shows moisturizing, exfoliating, antioxidant and brightening properties. Ascorbic acid is a powerful antioxidant found mainly in fruits and vegetables. It is commonly used in cosmetics since it affects the synthesis of collagen, reduces the production of metalloproteinases which are responsible for collagen degradation, modulates the proper composition of the lipid barrier of the epidermis, prevents hyperpigmentation, strengthens the walls of blood vessels by limiting their permeability. Unfortunately, L-ascorbic acid is unstable, and it easily oxidises under the influence of light. Therefore, special formulas have been developed to guarantee high stability and durability of products. Modern cosmetology is constantly searching for methods that would allow active substances to penetrate deep into the skin. Microneedle mesotherapy enables transepidermal penetration and facilitate the introduction of the active substance into deeper layers of skin. Controlled microinjuries induce inflammation in the dermis and stimulate fibroblasts to synthesize collagen which results in the skin becoming more tense. Moreover, this technique helps to reduce the expression of metalloproteinases which contributes to the diminishing of discoloration. Undoubtedly, a common feature of all the above-mentioned substances and method is their beneficial effect involving the reduction of skin aging symptoms.

Goals of study:

1. Comparative assessment of the effect of 20% and 30% azelaic acid on selected skin parameters, including: hydration, redness intensity, melanin level and skin elasticity.
2. Comparative assessment of the effect of combined therapy of azelaic acid and phytic acid as well as azelaic acid, phytic acid and vitamin C on selected skin parameters: hydration, redness intensity, melanin level and skin elasticity.
3. Comparative assessment of the effect of combined therapy of azelaic acid and vitamin C and microneedle mesotherapy combined with the same active ingredients on selected skin parameters: hydration, redness intensity, melanin level and skin elasticity.

4. Subjective assessment of treatment effects after a series of treatments and the occurrence of possible adverse reactions

60 volunteers aged 35-60, with II and III skin phototype according to the Fitzpatrick scale participated in this study. They were divided into 3 study groups. All participants of the study showed signs of aging skin, such as: discoloration, excessively dilated vessels, erythema, dryness, wrinkles. The study included a series of 8 treatments. In the first group, 20 women underwent a treatment with 20% and 30% azelaic acid and „split-face” method every 10-14 days. In the second group, 20 women were treated every 7 days with 20% azelaic acid in combination with 30% phytic acid or 20% azelaic acid combined with 30% phytic acid and 40% vitamin C. „split-face” method was used. In the third group, 20 women underwent treatments (at the same time interval) which included the application of 20% and 40% vitamin C on one side of the face and 20% azelaic acid, 10% vitamin C and microneedle mesotherapy on the other side.

The effectiveness of the treatments was assessed using the Mexameter, Corneometer and Cutometer probes of the MPA device - The Multi Probe Adapter Systems (Courage + Khazaka electronic GmbH, Köln, Germany). Before the examination and after the series of treatments, photos of participants' faces were taken with the use of Fotomedicus (Elfo®) photographic system.

Based on the obtained results, the following conclusions were drawn:

1. Peels containing 20% and 30% azelaic acid primarily reduce the level of melanin and erythema. Moreover, preparations containing this acid are very well tolerated by sensitive skin and they do not cause excessive irritation. There was no statistically significant difference between the effects of 20% and 30% azelaic acid, therefore, acid with a lower concentration was used for further studies to limit the possibility of side effects.
2. Topical application (layer by layer) of preparations containing azelaic acid, phytic acid and vitamin C improved skin elasticity, reduced the visibility of discoloration and erythema, and improved hydration. The innovative technique of multilayer application of two or three preparations did not cause irritation or allergic reactions. Moreover, the use of 2 or 3 properly selected active substances provides a better anti-aging effect due to complementarity of their actions.

3. The combined treatment consisting of microneedle mesotherapy, azelaic acid and vitamin C significantly improved the assessed skin parameters, without causing a long-term skin irritation. This method provided the most visible anti-aging effect since it significantly improved skin elasticity, hydration and reduced erythema and discoloration.

4. The combination of active substances and application techniques (microneedle mesotherapy) ensures better long-lasting effects. At the same time, such therapies are safe and do not cause adverse reactions.

5. The author's questionnaire confirmed the results obtained in the apparatus assessment. All participants in the study noticed a significant improvement in the condition of the skin after a series of treatments using chemical peels and microneedle mesotherapy. Women observed an improvement in overall skin tone, a reduction in redness, an improvement in hydration, a smoothing of fine wrinkles, an improvement in skin elasticity and a decrease in skin sensitivity to external factors