

SUMMARY OF THE DOCTORAL DISSERTATION

1. Title of the dissertation: *Jakość ekstraktów roślinnych proponowanych do zastosowania w kosmetykach przeznaczonych do cery trądzikowej*
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4. Summary (min. 1 800 characters with spaces):

Acne vulgaris is one of the most common chronic inflammatory dermatoses, whose pathogenesis includes excessive sebum production, abnormal keratinization of hair follicles, colonization by Cutibacterium acnes, and an inflammatory response. Standard therapies, including retinoids, benzoyl peroxide, topical antibiotics, and combination regimens, demonstrate documented effectiveness, but their use is often associated with adverse reactions and the risk of irritation, especially in individuals with sensitive skin. At the same time, many cosmetic ingredients, especially preservatives and fragrances, can be irritating or allergenic, limiting their use in acne-prone skin care. There is growing interest in natural plant extracts that exhibit anti-inflammatory, antibacterial, and antioxidant properties. Studies indicate the effectiveness of green tea, aloe vera, turmeric, and tea tree oil, among others, but comprehensive analyses of less common plant species are still lacking.

The aim of this study was to characterize the chemical properties, biological activity, and cosmetic potential of selected plant extracts with potential commercial applications in acne cosmetics. Extracts of lady's mantle (Alchemilla vulgaris), common flaxseed (Linaria vulgaris), and shepherd's purse (Capsella bursa-pastoris) obtained from various manufacturers were analyzed. The study included determining the content of phenolic compounds using liquid chromatography, assessing antimicrobial activity against Gram-positive and Gram-negative bacteria and yeasts, and analyzing consumer preferences using surveys and social media observations.

The results revealed significant differences between extracts. Lady's mantle extracts were characterized by the highest content of biologically active compounds and the strongest antimicrobial activity, particularly against Staphylococcus epidermidis, reaching MIC values of 0.4–0.8%. Common flaxseed demonstrated moderate activity, while shepherd's purse exhibited limited activity. These results correlated with the chemical profile of the extracts tested. Consumer opinion analysis confirmed the growing interest in natural cosmetics and the high acceptance of products with anti-inflammatory and antibacterial properties.

The analyses conducted demonstrate that lady's mantle extract is a promising active ingredient for use in cosmetics for acne-prone skin. The results provide a basis for further research on the effects of extracts in finished cosmetic formulations and their potential use as a natural alternative or complement to standard anti-acne therapies.