

SUMMARY

The aim of this study is to evaluate the effect of plant additives derived from food industry by-products on the physicochemical and functional properties of selected cosmetic products. The study included formulations of lye soaps containing apple and carrot pomace, glycerin soaps enriched with hazelnut shell powder, lip balms containing grape pomace, and shampoo bars containing hazelnut shell. The mechanical and functional parameters of the products were analyzed, including shear force, hardness, penetration force and work of penetration, and dynamic friction. Additionally, FTIR spectroscopic analysis was performed, along with an assessment of color parameters, antioxidant activity against the DPPH[•] radical, and total phenolic compound content. The obtained results showed that the addition of plant ingredients affected the mechanical properties of the cosmetics depending on the matrix used. In the case of lye soaps, the addition of pomace reduced the shear force, hardness, and work of penetration, indicating a weakening of the surfactant structure. In glycerin soaps, the addition of hazelnut shell did not cause statistically significant changes in hardness, but increased the dynamic friction value, giving the products potential exfoliating properties. Shampoos enriched with hazelnut shells exhibited greater hardness compared to the base formula, which may have a beneficial effect on product shelf life. In the case of lip balms, the addition of grape pomace did not significantly affect penetration power, but did cause significant changes in color parameters and a significant increase in antioxidant activity and phenolic compound content with increasing additive content.

FTIR analysis confirmed the preservation of the basic chemical structure of the tested cosmetics after the introduction of plant additives, with simultaneous changes in the intensity of selected spectral bands resulting from interactions between the additives and the product matrix. The obtained results indicate that food industry by-products can serve as valuable functional raw materials in cosmetic formulations, enabling the production of products with properties comparable to commercial cosmetics. The work fits into the concept of circular economy and sustainable development by utilizing plant waste for the production of cosmetics with potential health-promoting and antioxidant properties.

Keywords: pomace, cosmetics, industry, by-products