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Abstract of the doctoral dissertation titled: “Development of rinse-off cosmetic products that reduce plastic waste”

From a formulation perspective, rinse-off cosmetics consist mainly of water. Plastic packaging is the most commonly used solution in this product category. The main goal of the doctoral dissertation is to reduce water content in such products, enabling more efficient transport and storage, as well as reduced plastic use.

The first stage involved selecting suitable raw materials for cleansing formulas using foam analysis via backscattering detection. This allowed for the identification of ingredients providing optimal foaming properties. Prototypes were then developed in the form of concentrated solid bars: shampoo, body wash, and a conditioner for home preparation. Implementation studies included stability, dermatological, and microbiological tests. Toxicological analysis confirmed product safety. In vivo tests confirmed comparable or better performance than standard liquid rinse-off products. A simplified LCA showed environmental benefits of the proposed cosmetics.

The developed formulas allow for significant reductions in water consumption, plastic waste, and carbon footprint, offering tangible environmental advantages.