Deposition of fragrances on carriers with different physicochemical parameters

Agata Wawrzyńczak[1], Agnieszka Kłosowska[1,2], Veronica Latini[1], Daria Potyralska[1], Jagoda Chudzińska[1], Agnieszka Feliczak-Guzik[1]

[1]*Faculty of Chemistry, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 8, 61-614 Poznań*

[2] *Arcon Aromaty Sp. z o.o., Rubież 46, 61-612 Poznań*

agaguzik@amu.edu.pl

Fragrances are usually liquid mixtures of volatile chemical compounds with different structures, which are characterized by a pleasant scent. As a result, they find a wide range of applications, especially in the cosmetics industry, where they are used in almost all types of cosmetic products, including perfumes, hand and body wash products, as well as skin and hair care formulations. However, fragrances have a relatively short shelf life due to the fact that their components exhibit high volatility and reactivity in the presence of light, heat, moisture, and oxygen. The widely accepted method for stabilizing fragrances is deposition in suitable carriers and encapsulation [1]. This allows easier handling of fragrances during formulation, as well as ensures controlled release of fragrance in finished products. Fragrance carriers can be inorganic, such as silica-based materials, as well as organic, with natural polymers, such as alginate, gelatin, or chitosan, and semi-synthetic or synthetic polymers.

Within the framework of the presented research, natural thyme (*Thymus vulgaris*) essential oil (TEO), which exhibits antioxidant and antimicrobial activity, which can be beneficial especially in cosmetic products for the aging or acne-prone skin [2], as well as a lemon flavor for flavoring foods, such as tea, were used. The carriers applied for the deposition of TEO and lemon flavor were mesoporous silica and alginate microcapsules. Deposition on the silica was carried out by liquid-phase adsorption, while the polymer capsules were prepared by ionic gelation, during which an emulsion consisting of alginate and a fragrance of appropriate concentration was dropped into a $CaCl_2$ solution at a specified rate. In the next stage of the study, the gradual release of the fragrances from the carriers into the water-alcohol environment at different pH values was tested, using UV-Vis spectroscopy and gas chromatography. The obtained release profiles indicate a clear effect of the pH of the environment and the type of carrier used on the rate of release of fragrances.

Acknowledgement: The research was supported by the IDUB project S@R 141/04/UAM/X001.

1. A. Kłosowska, A. Wawrzyńczak, A. Feliczak-Guzik, Cosmetics, 26 (2023)10.
2. A. Kowalczyk, M. Przychodna, S. Sopata, A. Bodalska, I. Fecka, Molecules, 25 (2020) 4125.