Grzegorz Suwiński, rozprawa doktorska "Wykorzystanie nowych technologii w recepturowaniu produktów dermatologicznych zawierających surowce pszczele".

Streszczenie w języku angielskim

The use of bee-derived raw materials (Apis mellifera species) in treating diseases and skin care has a tradition spanning thousands of years. Reports on the use of honey for wound care dates back to antiquity. In modern times, approaches to cosmetic and medicinal products have changed significantly, including legal regulations regarding their safety and the development of evidence-based medicine. Despite advancements in knowledge and strategies to dermatological products, bee-derived raw materials continue to attract significant interest from researchers. Experiments focus on, among other things, the chemical composition of honey from various plants, propolis from different regions of the world, their pharmacological activity, and methods of incorporating these raw materials into products intended for skin application. Research into drug and cosmetic formulation technologies utilizes the chemical properties, and the bioavailability of the active ingredient.

In this work, new carrier technologies containing bee-derived raw materials were developed, characterized, and commercialized: an organogel with 90% w/w propolis extract and an oil-in-water cream with 5-15% w/w honey. The cycle of three scientific publications in this dissertation describes subsequent stages of work on the most promising technologies, created to improve the efficacy of products containing bee-derived raw materials. The final stage of the research was the technological implementation of two products in a pharmaceutical company.

The research published in this dissertation includes:

- P1 [Przem. Chem., 2021, 100.6, 600-605] a review of publications related to carrier technologies using propolis or its processed form. The publications were grouped and described. The review, along with examples of the characteristics of individual technologies, aimed to facilitate the selection of a carrier intended for the production of a new product containing a poorly soluble active substance – propolis.

- PAT1 [WUP UPRP 2022, 43, 5] a patent describing a method for preparing silicabased organogel technology enabling the incorporation of a high content (>90% w/w) of propolis.

- P2 [Materials 2025, 18, 266] an experimental publication characterizing the silicabased organogel presented in the patent. The characterization included studies of structure, rheology, stability, active substance release, and application properties. The organogel, consisting mainly of propylene glycol and silica, showed high physical and thermal stability, which is atypical for the organogel technology group. Another distinguishing feature of the studied technology compared to those commonly used in medicine was the partial or complete transparency of the gel, as well as an unusual change in the rheological profile when exposed to an aqueous alkali solution. The silica-based organogel, containing 10 wt. % ibuprofen, demonstrated a 80% release of the active substance into the solution within 24 hours. - P3 [Pharmaceuticals, 2024, 17, 1709]an experimental publication describing studies on the impact of honey concentration (0-15% w/w) in an O/W cream containing 2-methyl-1,3-propanediol on the application properties and skin parameters. The studies included questionnaires completed by participants, as well as measurements of skin hydration, transepidermal water loss, skin elasticity, smoothness, wrinkle surface, and average wrinkle depth. The studies showed no statistically significant differences in the application assessment of the individual creams. Differences, however, were observed in the measurements of skin hydration levels and wrinkle depth. When comparing creams containing honey to the placebo cream, the experiment demonstrated the beneficial effect of honey in the formulation on improving skin parameters.