

Synthesis of phytotherapeutic *Gypsophila eriocalyx* nanoparticles and evaluation of the effect on Osteoporosis

Sibel Ozer^{1*}, Ozan Baris Kurtur¹, Yasemin Budama-Kilinc², Serda Kecel-Gunduz³

^{1*}Yildiz Technical University, Istanbul, Turkey, sibelozero@gmail.com, ORCID: 0000-0002-6523-7637;
obkurtur@hotmail.com, ORCID: 0000-0002-6949-8615

²Yildiz Technical University, Istanbul, Turkey, yaseminbudama@gmail.com, ORCID: 0000-0003-0601-3091

³Istanbul University, Istanbul, Turkey, skecel@istanbul.edu.tr, ORCID: 0000-0003-0973-8223

Osteoporosis is the deterioration of bone tissue and micro-architecture with a decrease in bone mass due to osteoclastogenesis. Osteoporosis treatments are limited to the use of anti-resorptive drugs and anabolic agents to reduce the activities of cells responsible for bone resorption. Due to their low efficiency and undesirable effects, the use of synthetic drugs has been replaced by medicinal plant-based drugs.

Medicinal plants are considered rich sources of content that can be used directly in drug development. *Gypsophila eriocalyx* is an endemic species, that is suitable for medical purposes. *Gypsophila* species are known for their saponin content, and saponins show various activities such as antioxidant, anti-tumor, antimicrobial, and anti-inflammatory. Developing nanoparticles in osteoporosis to prevent the negative aspects of traditional treatments is a potential treatment method because it reduces systemic toxicity and improves therapeutic efficacy.

Within the scope of this study, chitosan nanoparticles loaded with *Gypsophila eriocalyx* were synthesized and characterization studies were carried out with various spectroscopic methods. In addition, the cytotoxic effect of chitosan nanoparticles loaded with *Gypsophila eriocalyx* was evaluated by the MTT test in the L929 cell line. Finally, the anti-osteoporosis efficacy of *Gypsophila eriocalyx*-loaded chitosan nanoparticles was evaluated *in silico* studies by molecular docking methods.

Keywords: *Osteoporosis, Gypsophila eriocalyx, Saponins, Nanoparticle, Chitosan*

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