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# Characterization of polymer-ceramic composites modified by Salvia officinalis extract

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Over the last few years, biomaterials have become increasingly important in materials science, with great hopes of solving problems in tissue and organ healing. Bioactive materials based on polymers, ceramics, and active substances are being designed to provide great potential for individual modification according to the patient's needs. By combining different types of materials and modifications, composites are created that enable cell proliferation and tissue growth. Some plant extracts are high in terpenes, polyphenols, and flavonoids, which show potential anticancer, anti-diabetic, and anti-inflammatory effects. Furthermore, numerous studies indicate osteoblast differentiation and bone formation under the influence of flavonoid compounds. The present study focused on the development of a methodology for the preparation of photocrosslinked polymer-ceramic composites based on polyvinylpyrrolidone (PVP), gelatin (GE), sodium alginate (SA), while the ceramic phase was synthetic hydroxyapatite (HA). In addition, the obtained system was enriched with an aqueous extract of sage (Salvia officinalis). To determine the kinetics of polyphenol release from the matrices, the obtained composites were incubated in water in a pharmaceutical system under continuous stirring conditions at 36.6°C. The antioxidant properties of the aqueous plant extract were determined by 1,1-diphenyl-1-picrylhydrazyl (DPPH) radical and the total content of phenolic compounds was determined by the Folin-Ciocalteau (F-C) colorimetric method. Polyphenolic compounds were released from the polymer-ceramic composites during 21 days of incubation. Moreover, the amount of the released compounds also depends on the composition of the chosen composition. Conclusion & Significance: The obtained polymer-ceramic composites can be a carrier of active substances. Moreover, these new-generation systems for controlled drug release have potential applications in bone regeneration medicine.

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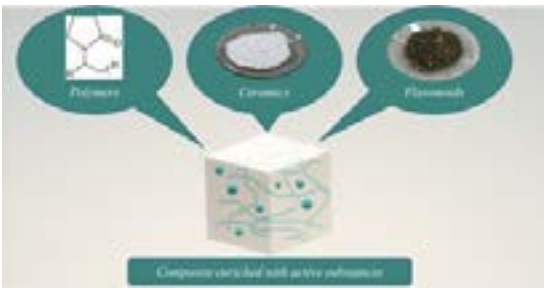

## Research Publications

1. N, Gomarian M, Ghasemi Pirbalouti A, Khaghani S, Malekpoo F (2018) Essential oil composition and total phenolic, flavonoid contents, and antioxidant activity of sage (Salvia officinalis L.) extract under chitosan application and irrigation frequencies. Industrial Crops and Products 117, 366–374.
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## Biography

Karina Piętak is a PhD student in the Department of Materials Engineering, Faculty of Materials Engineering and Physics, Cracow University of Technology. She conducts interdisciplinary research activities at the interface of materials engineering, chemical engineering, and nanotechnology. Her scientific interests include biomaterials such as composites for bone tissue reconstruction and dental applications.

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