Ceramic-polymer composites and its evaluation as a drug carrier for controlled release of Clindamycin

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Nowadays, the majority of organ and tissue damage resulting from genetic defects or trauma is treated either pharmacologically or surgically. This is accomplished by using appropriate drugs or, in more severe cases, organ transplantation. However, for some time now, great emphasis has been placed on biomaterials, intelligent bioactive materials that have great potential in regenerative medicine by stimulating surrounding tissues or local drug delivery.

Materials and tissue engineering provide opportunities to develop such smart materials. Hydroxyapatite (HA) is most commonly used for bone regeneration due to its impressive bioactivity, osteconductive properties, and ability to bond to natural bone tissue. By suspending it in a polymer matrix, it is possible to obtain a composite with specific parameters. In addition, the polymeric structure, offers incredible possibilities for modification with biomolecules or drugs. Thus, such materials can be used as a carrier of active substances for local drug delivery.

In the present study, polyvinylpyrrolidone (PVP) was the polymer phase. It is an essential, water-soluble polymer approved by the US Food and Drug Administration (FDA) as safe for body contact. The mineral phase constituted HA. A innovative composite was prepared and subjected to detailed physicochemical analysis. Additionally, the system was modified with the clindamycin, which increased its biological value. The drug release kinetics in the simulated body fluid and the effect of ceramics on this parameter were determined.

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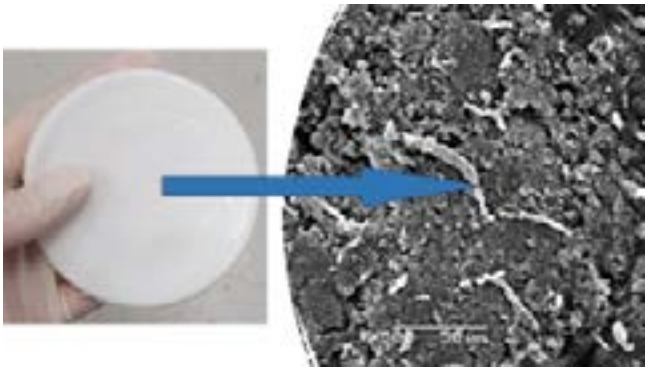

Research Publications

Nadem S, Ziyadi H, Hekmati M, Baghali M (2020) Cross-linked poly(vinyl alcohol) nanofibers as drug carrier of clindamycin. Polymer Bulletin 77:5615-5629.

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Biography

Agnieszka Sobczak-Kupiec undertakes interdisciplinary research activities at the interface of materials engineering, chemical technology and nanotechnology. Her scientific interests are related to biomaterials based on calcium phosphates for bone tissue reconstruction and dental applications, as well as nanomaterials for medical applications.

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