

Nanocomposites and nanomaterials

Alginate-Hydroxyapatite nanostructured composites for drug release

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Nanostructured composite materials based on hydroxyapatite and sodium alginate with incorporated medical drug – chlorhexidine (CH) bigluconate were synthesized and investigated.

For the formation of composite materials 0,167M calcium nitrate tetrahydrate, 0,1M diammonium dihydrophosphate were used as reported elsewhere [1]. Samples were prepared with a content of the Alg in relation to HA: 10 w/w %, 20 w/w %, 30 w/w %, and 40 w/w %. The suitability of CH - containing composite materials to act as slow release drug delivery systems was evaluated. It was also investigated the dependence of drug release process from the content of alginate and the method of the final material preparation - drying at 37°C, annealing at 1100°C or lyophilized.

It was shown that the content of the Alginate biopolymer and the finishing treatment of the material impact on the degree of uptake and release rate of the drug. In each group of samples with increasing amount polymer immobilized content per unit time drug and drug release increased.

The highest concentration of drug in phosphate buffered saline (PBS) was after 72 hours and the maximum speed of release was in the case of freeze-dried samples and lowest in the case of dried at 37°C samples.

1. V.M. Kuznetsov, L.B. Sukhodub, L.F. Sukhodub, Structural and Substructural Features of Apatite-biopolymer Composites: the Comparison of Data Obtained Using X-Ray Diffraction and Scanning Electron Microscopy with Electron Diffraction, **JOURNAL OF NANO- AND ELECTRONIC PHYSICS**, Vol. 6 No 4, 04039(6pp) (2014).