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Investigation of melatonin- β -cyclodextrin inclusion complexes in bone tissue engineering

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Osteosarcoma is a malignant bone tumor that mostly encountered among pediatric and adolescent age group. As a kind of treatment for osteosarcoma, the section of cancer tissue is surgically removed from bone and a bone defect is occurred. Melatonin (N-acetyl-5-methoxytryptamine), the hormone secreted by the pineal gland has not only anticancer effect because of its free radical scavenger but also has an important role on bone regeneration. Despite of these critical functions of melatonin, low water solubility limits its usage with high capacity. In this study, melatonin/hydroxypropyl- β -cyclodextrin (HP β CD) inclusion complex was formed to increase water solubility of melatonin using microwave treatment. Inclusion complex was characterized by Higuchi-Connor's phase solubility diagram, FTIR, NMR, XRD, DSC and TGA methods. Then, chitosan scaffolds were prepared and inclusion complex was embedded onto scaffolds. This carrier system is considered to affect directly to cancer cells and also provide a mechanical support in damaged area during bone regeneration. The release profile of melatonin from this system was investigated *in vitro*. Melatonin/HP β CD inclusion complexes were accomplishedly produced in solution state using microwave technology. Phase solubility studies proved that 1:1 (M/M) inclusion complex was obtained as well as other instrumental analysis were verified the occurrence of inclusion complex. *In vitro* release studies were conducted during 2 hours and approximately 86% of loaded melatonin was released from the scaffolds. In the upcoming future studies, characterization of loaded chitosan scaffolds and cell culture with MG-63 (human osteosarcoma cell line) will be done and specified by using related investigations.

Biography

Bedriye Topal has received her BSc Degree from Hacettepe University, Department of Chemical Engineering. She is MSc Student at the same department. Also, she is a member of Hacettepe University Cell and Tissue Engineering Research Group, headed by Prof Dr Menemşe Gümüşderelioglu.

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