IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)
ISSN (P): 2347-4580; ISSN (E): 2321-8851
Vol. 4, Issue 7, Jul 2016, 165-174

POLYLACTIC ACID/BIOACTIVE CERAMIC BIOCOMPOSITE SCAFFOLDS FOR BONE TISSUE ENGINEERING: A BRIEF OVERVIEW

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ABSTRACT

Polylactic acid (PLA) is a highly promising material for its biodegradability, nontoxicity, high mechanical strength, ability to be absorbed into human body and its non-toxic biodegradation products. However, when it comes to bone tissue engineering, PLA has major drawbacks such as low cell adhesion caused by its hydrophobic property, and inflammatory reactions *in vivo* due to its degradation product, lactic acid. One pragmatic solution for the mentioned problems is the introduction of bioactive ceramic nanomaterials. Indeed, the incorporation of bioactive ceramic particles into PLA matrix not only can buffer the localized PH decrease due to the PLA degradation products but also improves cell adhesion, mechanical properties, and osteoconductivity. In the present study, recent proposed approaches based on developing PLA composites containing calcium phosphate ceramics such as hydroxyapatite and tricalcium phosphate are reviewed, and biodegradability, mechanical properties and bioactivity assessments of PLA-based scaffolds containing different contents of the aforementioned bioactive ceramic particles are discussed in brief. This review is written with an aim to compile the works done in this field and focus on the properties of the PLA-based composites and their fabrications methods in the field of bone tissue engineering. The scaffolds reviewed here might demonstrate the optimal solution and the suitable PLA-based composite scaffolds for bone regeneration strategies.

KEYWORDS: Bone Tissue Engineering, Bioactive Ceramic Nanomaterials, Polylactic Acid

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