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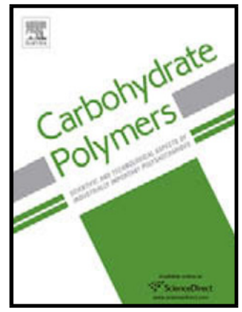

Title: Sugar-cane bagasse <!–<query id="Q1">Please check the D̈OC head̈for correctness.</query>–>derived cellulose enhances performance of polylactide and polydioxanone electrospun scaffold for tissue engineering

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<AT>SUGAR-CANE BAGASSE DERIVED CELLULOSE ENHANCES PERFORMANCE OF POLYLACTIDE AND POLYDIOXANONE ELECTROSPUN SCAFFOLD FOR TISSUE ENGINEERING

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<ABS-HEAD>Highlights► Extraction and characterization of cellulose from sugar-cane bagasse ► Blending of extracted cellulose with polylactide and polydioxanone ► Electrospun nanofibrous cellulose-based scaffold mats ► Physico-chemical and biological properties of cellulose-based mats

<ABS-HEAD>Abstract

<ABS-P>Bagasse is a waste product of sugar extraction from sugar-cane with approximately 30% cellulose content. Cellulose was successfully extracted from sugar-cane bagasse using a modified mercerization-bleaching approach with a 40% yield. Extracted cellulose was converted to cellulose acetate for enhanced electrospinnability and blended with poly-L-Lactide or polydioxanone before solution electrospinning. Physico-chemical evaluation of the electrospun mats showed variable miscibility of blends. *In vitro* cell studies with L929 mouse fibroblast cells was quite conclusive as regards the biocompatibility of the blended mats with proliferative behavior of cells, extracellular matrix deposition and characteristic features of healthy cellular response. MTT assay indicated that the cellulose blended mats induced higher cell densities than the controls. Cellulose content influenced parameters such as fiber diameter, porosity and cell-matrix interaction of mats impacting on cell growth and behavior. Preliminary assessment of biomineralization potential of the mats by SEM showed nano-hydroxyapatite deposits on the electrospun fibers.
<KWD>Keywords: sugar-cane bagasse; cellulose; electrospun nanofibers; skin tissue engineering; polylactide; polydioxanone

<H1>1. Introduction

The treatment of wounds in clinics is performed using autologous skin grafts or autografts and more recently commercial tissue engineered products for skin regeneration such as Dermagraft® (Shire Regenerative Medicine, Inc USA), Integra™ (Integra LifeSciences, USA), Karoderm™ (Karocell Tissue Engineering AB company, Sweden) (Vig et al., 2017; Kennedy et al., 2017). However due to the heterogeneous nature of wounds and their causes, skin regeneration treatment is faced with a myriad of challenges. Bone graft substitutes presently available, can be classified as allograft-based (e.g., OrthoBlast, IsoTis OrthoBiologics, Irvine Calif), factor-based (transforming beta, platelet-derived, fibroblast and bone morphogenetic protein), cell-based