

Electrospun Starch-polycaprolactone Nano Fibers

H. Ylikaupila¹, L. Nikkola¹, M. Gomes², R. Reis², N. Ashammakhi¹

¹ *Institute of Biomaterials, Tampere University of Technology, Tampere, Finland.*

² *3B's Research Group, University of Minho, 4710 Braga, Portugal and Dept of Polymer Eng, Campus de Azurém, U. Minho, 4800 Guimarães Portugal.*

INTRODUCTION: Starch based polymers have been widely studied for several different applications within the biomaterials field, including as scaffolds for tissue engineering. Recently electrospinning has been gaining interest as a promising method to manufacture highly porous 3D structures which provide high surface area for cell attachment and proliferation, being adequate for several uses in tissue engineering. The aim of this work is to develop nano-fiber based constructs from starch-polycaprolactone (SPCL 30/70 wt%) blends using electrospinning.

METHODS: SPCL was dissolved in acetic acid to form 14 w/v-% solution and stirred to produce an homogenous solution. About 0.1g of polymer in solution was electrospun onto substrate. The distance between needle tip and the substrate was 15 cm and the electric field was 13kV/cm. The microstructure of the obtained constructs was characterized by using scanning electron microscopy (SEM).

RESULTS: The electrospinning of SPCL produced a highly porous 3d scaffold with a typical nanofiber-mesh structure. SEM analysis revealed also the presence of starch particles (with an average size 6µm) which are interconnected by the polycaprolactone nanofibres of about 150nm. More details will be presented.

DISCUSSION & CONCLUSION: It is possible to produce highly porous nano-fibre based constructs from SPCL using electrospinning. Such constructs may have applications in tissue engineering of different tissues such as bone, skin and cartilage.

ACKNOWLEDGEMENTS: This work is in the framework of the European Comission Network of Excellence (EXPERTTISSUES Project).