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Cell viability of alginate / nanocrystalline cellulose hydrogels scaffolds obtained by extrusion 3D printing

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Hydrogels are crosslinked polymer networks with high water storage capacity, due to the hydrophilic functional groups present in the polymeric chain. Along with additive manufacturing (MA) processes, these materials can be used in many biomedical applications. Recently, these materials found new applications in bioprinting processes as printable materials (inks) and as cell carriers in bioink formulations. During the printing process, the systems behave as a gel and the full crosslinking occur after printing resulting in a hydrogel scaffold. Since the printing process involves materials flow, the rheological properties of these materials play an important role in defining their printability. In this work, was studied the cell viability of extrusion-based printed alginate/ nanocrystalline cellulose (CNCs) nanocomposite hydrogels scaffolds. Extrusion printing was performed using a homemade modular head developed and gel printability was defined by a procedure based on ink or gel rheological properties and processing parameters. After printing, the scaffolds were seeded with $3x10^3$ mouse fibroblast cells and the cell viability was tested, cytotoxicity and adhesion tests were performed. Based on the results, CNC/Alginate gels might have potential as bioprinting materials for applications in Tissue Engineering.