3D-PRINTING OF POLYETHYLENGLYCOL DIACRYLATE HYDROGELS IN THE PRESENCE OF FISH GELATIN AS CO-INITIATOR

Michael Zanon, Annalisa Chiappone, Desirèe Baruffaldi, Francesca Frascella, Marco Sangermano

Department of Applied Science and Technology, Politecnico di Torino, C.so Duca Degli Abruzzi 24, 10129, Torino, Italy

Recently, one of the main goals in bioengineering is the possibility to provide personalized scaffolds to resemble patient's tissue defects. Three-dimensional (3D) bioprinting can have the ambition to fulfill the needed requirements. These technologies are of extreme interest because of the ability to recreate complex 3D-shaped photocured geometries starting from liquid resin seeded subsequently with cells [1]. In particular, direct light processing (DLP) printers can create layer-by-layer models with high resolution and printing speed, regardless of the layer complexity and area [2]. Herein, the 3D printability of cold-water fish gelatin used as co-initiating species for the crosslinking of PEGDA monomers in presence of camphorquinone (through a Norrish II reaction) is evaluated (Figure 1) [3]. The real-time photorheological measurements showed that gelatin promoted the photopolymerization at any concentration, reducing the induction time of photo-crosslinking. ATR-FTIR spectroscopy proved that gelatin segments were incorporated within the network of PEGDA. Moreover, the cytotoxicity and the viability of 3D printed scaffolds with different gelatin content were investigated. The results of this work propose a new bio-ink for DLP printers suitable for cell culture and the implementation of such hydrogels in a wide range of scaffolds.

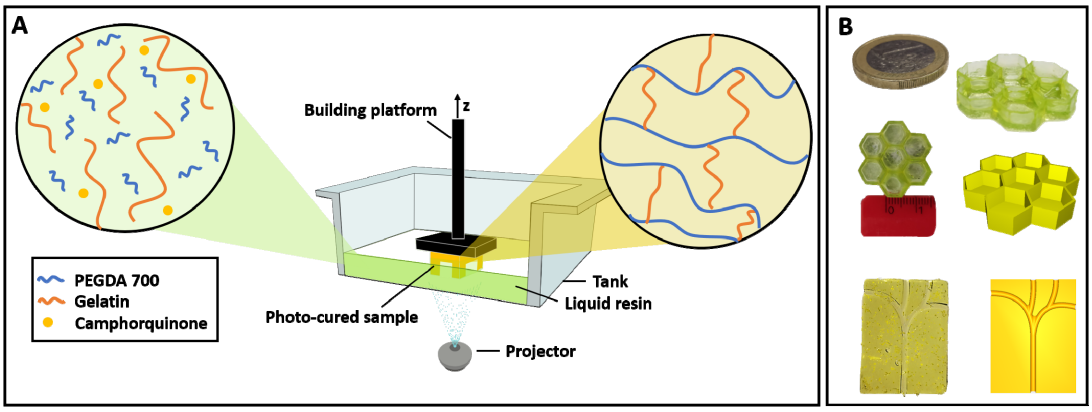

Figure 1: DLP printing scheme (A) and printed geometries (B).

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