Sunmi Zo et al., Chem Sci J 2018, Volume 9
DOI: 10.4172/2150-3494-C2-021

Use of waterborne polyurethane as a crosslinker on gelatin three-dimensional constructs

Sunmi Zo[1], **Soonmo choi**[1], **Eunjoo Shin**[2], **Hanjo Bae**[3] and **Sungsoo han**[1]
[1]Yeungnam University, Republic of Korea
[2]Dong-A University, Republic of Korea
[3]Korea Polytechnics University, Republic of Korea

Solvent-borne polyurethanes (PUs) have been extensively employed in feild of coatings, adhesives, elastomers as well as biomaterials for biomedical area due to excellent properties such as elasticity, durability, tensile strength, etc. The processing of solvent-borne PUs include evaporation of organic solvents, which adds to organic compounds content in the atmosphere. Consequently, various environment protection agencies have taken serious steps to reduce organic compounds emission from the industrial sector and issued guidelines to combat the same. Under such situations, a paradigm movement in research has been observed in the development eco-friendly polymeric materials. Therefore, waterborne polyurethane (WPU) has emerged out as one of the greener alternatives. The WPU is formed when a polyurethnae pre-polymer containing isocyanate functional groups is subjected to disperse into water either directly or by means of the phase-inversion emulsification process. WPU technology used water as the primary dispersion solvent. The resultant WPU materials would provide much advantage including zero levels of organic compounds, namely environmentally friendly process, nontoxic, good applicability, versatility, and low temperature flexibility, thereby being easy to integrate cells into constructs. Accordingly, WPU is inevitably required as biomaterials for biomedical applications. Gealtin has been also widely used for biomaterials owing to proper mechanical properties caused from strong hydrogen bonding, biodegradability, bio compatibility. However, glutaraldehyde (GA) maily used as crosslinker for fabrication of gelatin-based bioconstructs, which cause toxicity by residues of GA, directly causing fall in cell viability within gelatin-based constructs.In this study, we first time introduce to use WPU as crosslinker on gelatin three-dimensioanl bioconstructs. For this, hydroxyl groupps of gelatin are reacted with isocyanate groups of WPU, thereby leading to strong bond of urethane link by polyaddition reaction.

Biography

Sunmi Zo is a PhD scholar at the biomaterials lab of Yeungnam University. Her research work is on synthesis of biocomposites for stem cells differentiation especially osteogenic lineage. Exploiting the physico-chemical properties of the material to induce differentiation in progenitor cells could overcome the bottleneck faced by tissue engineered constructs. Soonmo Choi is a research professor at Yeungnam University. She obtained her PhD in 2013 for engineering bilayer polymeric scaffold for skin tissue engineering and was awarded national research foundation of korea project. As a research professor, she has been focusing on identifying special ligands on cell surface that act as attachment site when cultured on three-dimensional polymeric substitute.

sshan@yu.ac.kr

Notes: