CHITOSAN - PVA BLENDS FOR TISSUE ENGINEERING SCAFFOLDS

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ABSTRACT

Chitosan is a polysaccharide widely used as a biomaterial for tissue engineering. On the other hand, polyvinyl alcohol (PVA) is a synthetic polymer which has also been found very suitable for this application. Both polymers are biocompatible and biodegradable and their blends exhibit good compatibility as well as mechanical properties [1,2].

Thus in this research, we blended solutions of commercial chitosan and PVA at various proportions, to manufacture porous scaffolds using the salt leaching/gas foaming technique. The scaffolds so obtained were further crosslinked with sodium trimetaphosphate (STMP), which is a non-toxic salt and has not been yet reported for this system. Through tensile strength, density and swelling measurements, we optimized the crosslinking degree. Scanning electron microscope (SEM) was used to evaluate porosity and morphology and by infrared spectroscopy we measured spectral differences which were related to crosslink and interactions between the two polymers. Cell viability and proliferation was assayed by MTT. The scaffolds display a good mechanical performance, with an average Young modulus ranging between 30 to 60 MPa, which is found adequate for scaffolds. SEM micrographies showed adequate porosity and interconnectivity, with pore sizes larger than 10μm, appropriate for cells to adhere and grow. In addition, MTT evidenced high level of biocompatibilty. Through these results we conclude that these materials may be used for scaffolds in tissue engineering.

References

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