
**Optimisation of gelatin crosslinking in bicomponent electrospun nanofibres with the use of EDC/NHS**

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**INTRODUCTION:** Introducing gelatin into synthetic polymeric materials has unquestionable advantages for tissue engineering. In our previous studies we have demonstrated the feasibility of using nontoxic solvents for electrospinning of polycaprolactone/ gelatin (PCL/Gt) blends [1], as well as a necessity of preserving the biopolymer within the fibre due to its susceptibility to dissolution in hydrous environment [2].
Looking for a compromise between cheap, fast and low toxic, a set of four crosslinking agents were examined during preliminary studies. **EDC/NHS** (1-ethyl-3- (3-dimethylaminopropyl) carbodiimide hydrochloride/N-hydroxy-succinimide) method proved to meet best our requirements.

**METHODS:** A broad set of varying conditions was established based on the results of EDC/NHS preliminary results. Electrospun materials with different PCL/Gt ratios were subjected to crosslinking with EDC/NHS solutions with varying concentrations for periods ranging from 1 to 9 hours. All samples underwent biodegradation studies, crosslinking degree tests, SEM imaging, as well as wettability and mechanical properties examination.

**RESULTS & DISCUSSION:** Analysis of gelatin crosslinking results, showed that the kinetics of the process is very fast at the beginning followed by slow stage at longer time of the process. The critical time, needed to get 85% of crosslinked gelatin, is a function of EDC/NHS solution concentration, being the shorter the higher is this concentration.

**CONCLUSIONS:** EDC/NHS method gives an operator the freedom in setting out crosslinking conditions since time and solution concentration are inversely interchangeable. For any studied conditions, this method gives satisfactory crosslinking degree cheaper and faster than any of its competition.

**ACKNOWLEDGEMENTS:** This work was funded by the Polish National Science Center (NCN) under the Grant No.:
2015/17/N/ST8/02027.

**REFERENCES**

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