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Abstract Letter

MODIFICATION OF CARBOXYMETHYLCELLULOSE WITH PHENOLS FOR PEROXIDASE INDUCED HYDROGELS FORMATION AND ELECTROSPINNING

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Carboxymethylcellulose (CMC) is water-soluble cellulose ether which is used in food and cosmetics industry. It also has big potential for use in pharmaceutical products due to its high biocompatibility, biodegradibility, low immunogenicity and low price. Crosslinked CMC can absorb large amounts of water and swell to form hydrogels with great physical properties. The need for new biomaterials and hydrogels is growing daily, due to their use in tissue engineering, drug delivery and cell and enzyme immobilization studies. In this study we modified CMC, in order to get a crosslinkable polymer that can make hydrogels by chemical and enzymatic means. After periodate oxidation of CMC we obtained CMC with different degrees of oxidation: 2.5, 5, 10, 15 and 20 mol%. Further modification using reductive amination in the presence of different phenolic compounds like tyramine, was done. This modification of CMC was confirmed by UV–VIS and FT-IR spectroscopy, while concentration of phenol and ionizable groups was determined using absorbance at 275 nm and acid–base titration. All CMC-tyramines were able to form hydrogels after cross-linking with horse radish peroxidase (HRP) and hydrogen peroxide. CMC derivatives have been successfully electrospun and crosslinked afterwards. Due to the introduction of amino groups and decrease in molecular weight, they were significantly more soluble in water up to 30 % (w/w) compared to native polysaccharides and their electrospinability also improved. We aim to make nanofibers using tyramine-polysaccharides that will be more stable in cell culture media after cross-linking covalently and with calcium/barium ions. Diameter of nanofibers was determined by scanning electron microscopy (SEM). Cross-linked nanofibers that we obtained will be used for tissue engineering of blood vessels.