Polysaccharides-catechols films-based antibacterial drug release system

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Natural polymers, due to their favorable properties, have shown great potential for biomedical applications. Among them, polysaccharides have been widely studied as films for controlled drug release systems [1]. Crosslinkers are usually added to their formulations, since the crosslinking degree greatly influence the drug release kinetics. Natural crosslinkers, such as catechols, are of particular interest since they have shown intrinsic antibacterial and anti-inflammatory properties. However, depending on their concentrations, they may induce cytotoxic effects, that can be limited by complexation with a metal atom [2]. In this study, different biopolymers films were obtained by solvent casting from agarose or chitosan solutions mixed with catechol and antibiotic, herein tannic acid and gentamicin respectively, with and without metal addition. The obtained films have been characterized by FTIR, XPS and water contact angle. The antibiotic release kinetic has been evaluated by ELISA test or HPLC quantification. The films antibacterial effects were tested against *S. aureus*and *E. coli*and the cytotoxicity on human cells was studied. Results show how the addition of catechols increases the crosslinking degree and influences the release kinetic of the loaded drug when compared to uncrosslinked films [3]. Also, the addition of metal has prolonged the antibacterial activity, from few days up to 2 months, and lowered catechol cytotoxic effects. Therefore, polysaccharides-catechols films appear as a promising approach for antibacterial drug release system, and as a viable and ecofriendly platform to address biomaterial-related infections at medium-term.

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References

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