

PhD defense

Exploring hydrogels based on the self-assembly of a Fmoc-based tripeptide: physicochemical characterization and antibacterial properties

Présenté par

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Hydrogels are 3D networks of fibers that retain large amounts of water when swollen. Due to their biocompatibility, they are increasingly used for drug delivery. To develop antibacterial peptide-based hydrogels, this dissertation presents two studies based on the use of a fluorenylmethoxycarbonyl (Fmoc)-protected phosphorylated tripeptide that can self-assemble into a hydrogel. In the first study, different preparation conditions (pH, salt, presence of polysaccharide) were investigated to obtain a self-healing and antibacterial hydrogel capable of releasing an antibiotic, florfenicol. In the second study, a solid-phase peptide and phosphoramidite synthesis strategies were combined to add florfenicol to the Fmoc-protected tyrosine phosphate via a phosphodiester, which can be cleaved by nucleases produced by bacteria. Encouraging results showed the formation of the targeted compound, paving the way for the design of a self-defensive antibacterial peptide.

Keywords: Fmoc-FF, peptide-based hydrogels, electrostatic assemblies, antibacterial hydrogels, drug delivery matrices