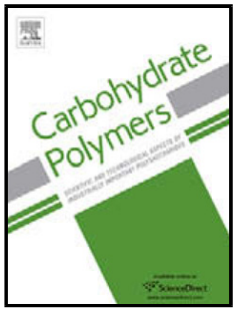

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Synthesis of graft copolymers based on hyaluronan and poly(3-hydroxyalkanoates)

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Highlights

- Joining two natural motifs: hyaluronan (HyA) and poly(3-hydroxyalkanoates) (PHAs)
- Hydrolysis of PHAs yielded oligomers suitable for HyA covalent grafting
- 1,1, Carbonyldiimidazole allowed hyaluronan modification under mild conditions
- Water soluble copolymers as potential carriers for drug delivery

Abstract

This work reports the synthesis and characterisation of new amphiphilic hyaluronan (HA) grafted with poly(3-hydroxyalkanoates) (PHAs) conjugates. Hydrolytic depolymerisation of PHAs was used for the synthesis of defined oligo(3-hydroxyalkanoates)-containing carboxylic terminal moieties. A kinetic study of the depolymerisation was followed to prepare oligomers of required molecular weight. PHAs were coupled with hydroxyl groups of HA mediated by N, N'-carbonyldiimidazole (CDI) or HSTU Tetramethyl-O-(N-succinimidyl) uronium hexafluorophosphate. For the first time, the covalent bonding of oligo derivatives of P(3-hydroxybutyrate), P(3-hydroxyoctanoate), P(*3-hydroxyoctanoate-co-3-hydroxydecanoate*) and P(*3-hydroxyoctanoate-co-3-hydroxydecanoate-co-3-hydroxydodecanoate*) and HA was achieved by "grafting to" strategy. Achieved grafting degree was a function of hydrophobicity of PHA, Mw and polarity of the solvent. The most suitable reaction conditions were observed for oligo (3-hydroxybutyrate) grafted to HA (grafting degree of 14 %). Graft