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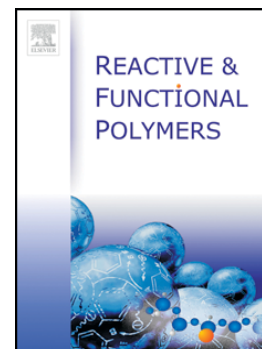
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Modification of microbial polymers by thiol-ene click reaction: nanoparticle formation and drug encapsulation

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ABSTRACT

Comb-like amphiphilic polymers were obtained by grafting long paraffinic chains on microbial poly(γ ,DL-glutamic acid) and poly(β ,L-malic acid) through two steps, *i.e.* allylation of the carboxylic side groups followed by UV-initiated thiol-ene *click* reaction with 1-alkanethiols bearing 8, 12 and 16 carbon atoms, and their characterization was accomplished by ^1H NMR, GPC and DSC. The grafted polymers were capable of self-assembling in nanoparticles with diameters in the 80-240 nm range. Incubation in water under physiological conditions led to hydrolysis of the lateral ester bonds followed by scission of the polyamide or polyester main chain. The model drugs, Theophylline and Carbamazepine, were efficiently encapsulated in these systems with much better results attained for the later. Drug release from nanoparticles incubated under physiological conditions occurred with a burst effect and were completely discharged in 24 h. Release profiles recorded from drug-loaded films suggested that the drug was delivered in both cases through a diffusion process.

Keywords: poly(γ -glutamic acid); poly(β ,L-malic acid); click-reaction; drug encapsulation; biodegradable nanoparticles.

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