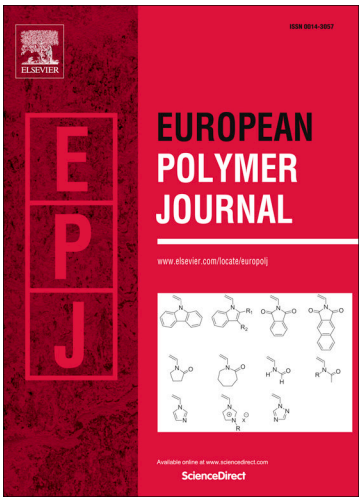

New guanidine-containing polyelectrolytes as advanced antibacterial materials

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New guanidine-containing polyelectrolytes as advanced antibacterial materials

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Abstract: New copolymer of 2,2-diallyl-1,1,3,3-tetraethylguanidiniumchloride and 2-hydroxyethylacrylate was obtained by free radical copolymerization technique for the first time. It was found that 2,2-diallyl-1,1,3,3-tetraethylguanidinium chloride is involved in copolymerization with acrylate to give rise to pyrrolidinium structures. Chemical modification of guanidine-containing polymer was carried out in two directions. According to one direction, polymeric guanidine-containing conjugates were obtained by anion exchange reaction via hydroxide. On the other hand, new biocide polymeric guanidinium salts were obtained by the interaction of acrylate hydroxy group of the copolymer with biologically active acids in the presence of dehydrating agent dicyclohexylcarbodiimide and esterification catalyst 4-dimethylaminopyridine. NMR, FTIR and element analysis were used to confirm the chemical structure and element composition. New guanidinium polyelectrolytes are effective in controlling Gram positive and Gram negative bacteria.

*Keywords***:** 2,2-diallyl-1,1,3,3-tetraethylguanidiniumchloride, radical copolymerization, chemical modification, antimicrobial activity

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1. Introduction

Creating the new biocide polymers is an important trend in modern macromolecular chemistry. This is due to the fact that the wide extension of resistant strains to many antibacterial substances, and the possibility of their epidemic spread is a serious problem for effective antimicrobial therapy. Recently, the use of antiseptics and desinfectants has been questioned because of the possibility of hospital-acquired infections. Besides that, bacteria can be altered with respect to their susceptibility towards other antiseptics and antibiotics.