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# Modifications of the hydrophilicity of heterocyclic methacrylate copolymers for protein release

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## Abstract

A series of copolymers comprising ethyl methacrylate (EM) and tetrahydrofurfuryl methacrylate (THFMA) gelled with either THFMA monomer or hydroxyethyl methacrylate (HEMA) monomer have been developed. In this paper, we examine the water uptake characteristics of the polymer systems and address the possibility of increasing the hydrophilicity of the systems by changing the ratios of the copolymers. We have investigated whether protein release from the polymers is related to the composition of the polymer systems. More protein was released from the polymers gelled with the more hydrophilic monomer (HEMA) than with THFMA. This was consistent with the calculated diffusion coefficients, which were 10 times greater for the polymers gelled with HEMA than those gelled with THFMA. Interestingly, the water uptake and protein release profiles were not dependent on the ratio of EM and THFMA in the copolymers. This is probably due to the conflicting roles of THFMA in the copolymer; it is both the more hydrophilic component as well as a cross-linking agent. In addition, it would appear that the structural and surface topography of these polymers had more significant effects on protein release than copolymer composition.

## Keywords

Polymers; drug release; water uptake; hydrophilicity