CONTROLLED RELEASE FROM SOLUTE PARTICLES DISPERSED IN A pH-RESPONSIVE POLYMER HYDROGEL

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The objective of this PhD EPSRC Case project is to investigate a new technology for giving triggered release of active solutes dispersed in polymer films under conditions of zero-order kinetics. The first stage of the project is to study the release of solute from dispersed solute particles encapsulated by a pH-responsive polymer hydrogel. The solute is carbendazim. A polymeric surfactant was prepared for dispersing the carbendazim particles prior to encapsulation by the hydrogel. The polymeric surfactant, poly(DEA-*co*-PEGMa) (diethylacrylamide and poly(ethyleneglycol) methacrylate) was characterised using NMR, GPC and pH-responsive turbidity measurements. The molar extinction coefficient and solubility limit of carbendazim were also measured. The ability of poly(DEA-*co*-PEGMa) to disperse the carbendazim particles was investigated using sedimentation experiments and the optimum composition determined. The particle size distribution of the dispersed carbendazim particles in aqueous solution was also investigated. Finally, the dispersed particles were encapsulated by poly(DEA) hydrogel and the solute release profiles were measured. The effect of pH on the release profile was investigated. The results are used to determine the effect of pH on the solute release profile for the encapsulated carbendazim particles.