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## Physicochemical and pharmaceutical properties of HEA-HEMA hydrogels

I Ermolina<sup>1</sup>, E Hackl<sup>1</sup> and V Khutoryanskiy<sup>2</sup>

<sup>1</sup>De Montfort University, UK

<sup>2</sup>University of Reading, UK

Over the last years the hydrogels have attracted considerable attention due to their capability to be used for numerous pharmaceutical and biomedical applications (i.e. drug delivery systems, contact lenses and wound dressings). Hydrogels are swellable polymeric materials capable of imbibing a large amount of liquid and, therefore, a large amount of drug. Recently we have described novel cross-linked 2-hydroxyethylacrylate-co-2-hydroxyethylmethacrylate (HEA-HEMA) hydrogels with different co-polymer compositions synthesized by three-dimensional free-radical copolymerisation. The aim of the present work is to characterize the physicochemical and pharmaceutical properties of HEA-HEMA hydrogels, which potentially can be used as sustain drug delivery systems. The effects of the hydrogel composition (HEA/HEMA ratios) and liquid medium (aqueous PEG and glycerol solutions) on morphology, swelling and mechanical properties were examined using different analytical techniques. The molecular dynamics results for hydrogels were obtained by Broadband Dielectric Spectroscopy. The current study has been specifically focused on the analysis of the free/bound water redistribution in the hydrogels using thermoanalytical techniques. Also the effect of different methods of sterilization was studied with respect to the stability of hydrogels. The pharmaceutical aspect of this study included the analysis of drug loading and release for the cases of low molecular weight drugs (riboflavin, ibuprofen) and proteins (lysozyme). The results show that HEA-HEMA hydrogels can be used as a sustain drug delivery system for both small drugs and biomacromolecules. The variation of the HEA-HEMA composition as well as liquid medium permits controlling the properties of hydrogels allowing producing the hydrogels with the drug release rate desired.

### Biography

I Ermolina has completed her PhD from Kazan Institute of Biochemistry and Biophysics, Russian Academy of Sciences in 1995, followed by Post-doctoral studies from Hebrew University of Jerusalem, Glasgow University and Southampton University. Currently, she is a senior Lecturer at De Montfort University, Leicester, UK, teaching the pharmaceutical technology, pharmaceutical material sciences and analytical techniques. She has published 45 papers in the peer reviewed journals and has been serving as a reviewer for several scientific journals.

[I.Ermolina@dmu.ac.uk](mailto:I.Ermolina@dmu.ac.uk)

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