In Vitro Characterisation of Vancomycin Loaded Glyceryl Monooleate-Water Liquid Crystalline Gel/Implants for Ocular Application

S. Milak 1, J. Pardeike 1, A. Chemelli 2, O. Glatter 2, A. Zimmer 1

1 Institute for Pharmaceutical Sciences, University of Graz, Graz, Austria
2 Institute for Chemistry, University of Graz, Graz, Austria

E-mail: spomenka.milak@edu.uni-graz.at (S. Milak)


In the present investigation, vancomycin was incorporated in liquid crystalline gel made of glyceryl monooleate and water, with the aim to achieve a sustained-release and to deliver locally sufficient concentrations of vancomycin to the eye, improving its efficacy against bacterial infections [1–3].

Technique for implants preparation was developed involving combining glyceryl monooleate and vancomycin solution by vortex mixing, centrifuging, preparing the shape of implants and lyophilization.

In vitro characterization of liquid crystalline gel/implants included structure analyses by light microscope with polariser and small angle X-ray scattering. Furthermore, the drug release from the implants was studied. Structure analyses of samples with different percentage of water showed, that samples with 10% water show a lamellar phase, whereas samples with 23–30% of water have a cubic phase, Ia3d, and the samples with 40% of water show a mixture of two cubic phases, i.e. Ia3d and Pn3m.

Investigating release properties of implants with an initial water content of 30% slow release was found. Approx. 40% of vancomycin was released within 2 hours.

The in vitro characterization of the liquid crystalline gel formulation/implants containing vancomycin showed the possibility to obtain different phases, i.e. lamellar phase and cubic phase as well as the possibility to sustain the release of vancomycin from them. Therefore, the implants show a great potential for the local treatment of infections of the eye.