

**Institute of Pharmaceutical Technology and  
Regulatory Affairs  
Faculty of Pharmacy  
University of Szeged**

# **I. Symposium of Young Researchers on Pharmaceutical Technology, Biotechnology and Regulatory Science**

**Szeged, Hungary**



**31<sup>th</sup> January  
2019**



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**OP-15**

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## **Novel ophthalmic formulations to increase the efficacy and stability**

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The efficient therapy in ocular diseases is limited by the physiological barriers and defensive mechanisms of the eye. To reach the proper therapeutic effect, development of novel ophthalmic formulations is necessary with increased drug permeation and retention time on the surface of the eye.

Cyclodextrin (CD) derivatives are commonly used as additives in different pharmaceutical products. CDs can form water-soluble inclusion complex with lipophilic active ingredients, thus the increased penetration and improved stability of the dissolved drug are expected [1]. In this work eye drop formulations were developed with increased efficacy and stability. All formulations were set to the required parameters, which meet the physiological parameters of eye. Firstly, cyclodextrin derivatives were used to enhance the efficacy of the anti-inflammatory prednisolone by formation of water-soluble inclusion complex. To increase the retention time of this formulation, mucadhesive antimicrobial polymer was applied. The drug-cyclodextrin complex formation, the diffusion of prednisolone, surface tension, viscosity, mucoadhesivity and the antimicrobial stability of the eye drops were investigated by different methods [2]. The cytotoxicity and drug permeation were studied on human corneal epithelial cell lines. In the second main part, the stability of antibiotic, rifampicin containing eyedrops was enhanced by cyclodextrin inclusion complex and freeze-drying method. The stability of the rifampicin-cyclodextrin complexes and freeze-dried samples was investigated at different circumstances and time periods by HPLC. The residual moisture and reconstitution time were also studied.

According to the results, this work can be an innovative approach to develop ophthalmic formulations with increased efficacy and stability.

### **References:**

1. Loftsson T. et al. *Int. J. Pharm.* 329(1–2), 1–11. (2007)
2. Bíró T. et al. *Drug Des. Devel. Ther.* 12, 2529–2537 (2018)