



## REMOVAL OF CARBAMAZEPINE FROM WATER BY POLYAMIDE NANOFILTRATION MEMBRANES IN A CROSS-FLOW SYSTEM

Jelena Šurlan<sup>1</sup>, Zita Šereš<sup>1</sup>, Nikola Maravić<sup>1</sup>, Nataša Đurišić-Mladenović<sup>1</sup>, Igor Antić<sup>1</sup>,  
Carla Brazinha<sup>2</sup>, João G. Crespo<sup>2</sup>

<sup>1</sup>Faculty of Technology Novi Sad, University of Novi Sad, Bul. cara Lazara 1, 21000 Novi Sad, Serbia

<sup>2</sup>LAQV-REQUIMTE, Department of Chemistry, NOVA School of Science and Technology, FCT NOVA, Universidade NOVA de Lisboa, Caparica 2829-516, Portugal

*e-mail: jelena.surlan@uns.ac.rs*

### ABSTRACT

Presence of pharmaceuticals in various water sources is often reported, due to their partial removal by conventional water treatments, as well as their persistency in the environment. Carbamazepine (CBZ) is an antiepileptic drug that is frequently detected in wastewater. The aim of this study is to determine efficiencies of three commercially available polyamide membranes with different molecular weight cut offs (MWCO) in the removal of carbamazepine. Molecular weight (MW) of carbamazepine is 236.27 Da, while the MWCO of the selected membranes is 200 Da, 150-300 Da and 400 Da, according to the manufacturers. Nanofiltration experiments were conducted in METcell® cross-flow filtration unit (EVONIK, Germany), while high pressure nitrogen gas cylinder was used for obtaining the pressure in the unit. Rejections were calculated based on the amount detected in the permeate and retentate. Rejections of carbamazepine were 95.79%, 52.72% and 76.62% for membranes with MWCO 200 Da, 150-300 Da and 400 Da, respectively. The highest rejection of carbamazepine was observed for the membrane with the lowest MWCO (200 Da). Membranes with MWCO higher than MW of carbamazepine had significantly lower rejections, however, rejection with the membrane with MWCO 400 Da was higher compared to the membrane with MWCO 150-300 Da.

*Keywords: nanofiltration, carbamazepine, pharmaceuticals, water treatment*

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