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**BOOK OF  
ABSTRACTS**



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# Application of polyamide nanofiltration membranes in removal of clarithromycin from water samples

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**Keywords:** clarithromycin, polyamide, nanofiltration, water.

**Introduction.** The significance of trace amounts of organic compounds as pollutants resulting from industrial, agricultural and medicinal usage is becoming progressively recognized. Hormones, antibiotics, and other pharmaceuticals, along with personal care products, can find their way into aquatic habitats through wastewater treatment facilities, which are usually not designed to remove corresponding substances<sup>[1]</sup>. Reverse osmosis and nanofiltration, in particular, are membrane techniques that have demonstrated encouraging application in the removal of emerging contaminants potential due to their advantages of excellent product quality, minimal initial investment, easy scaling up<sup>[2]</sup>.

**Experimental/methodology.** For the purpose of nanofiltration experiments METcell<sup>®</sup> cross-flow system (EVONIK, Germany) was used. The pressure driving the process was maintained by using high-pressure gas from a gas cylinder. Total amount of the initial sample was 600mL with a permeate samples collected as the first 300mL of the filtered liquid (concentration factor 2). Total time of filtration was 60min. Two polyamid flat sheet membranes were used in the corresponding experiments: DK (SUEZ, PA-TFC, MWCO 150-300Da) and NF270 (Dow Filmtec, PA-TFC, MWCO 400Da). Feed sample was spiked with 300 ng/L of clarithromycin (MW 748Da) in ultrapure water. Filtration was conducted at 25°C, feed flow rate 300mL/h and permeate flux 5.88mL/h. Rejection of clarithromycin was investigated at three different pH values, 4, 7 and 10.

**Results and discussion.** The illustration of obtained results is presented in Figure 1. Both membranes showed clarithromycin rejection higher than 80% in all conducted experiments. The highest rejection rate, 97.55% was noticed in the experiments where NF270 was used at the aqueous solution pH 4. Evident decrease in clarithromycin rejection with the rising pH values is observed in all conducted experiments. The content of clarithromycin in permeate samples obtained by using NF270 membrane is up to 10% lower compared to the samples obtained by using DK, which was not expected based on the MWCO values of corresponding membranes. The obtained results suggest possible impact of specific characteristics of membrane surface. The rejection rate is also influenced by clarithromycin specific molecular descriptors (pKa and logKow) values<sup>[3]</sup>.

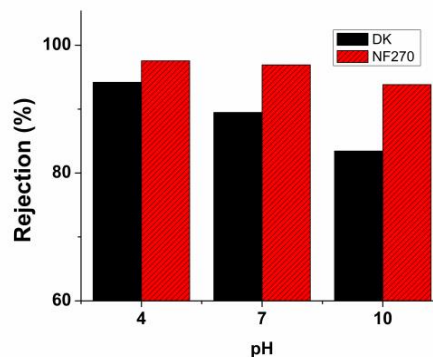


Figure 1 Rejection of clarithromycin depending on the solution pH and membrane used

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