



Antibacterial properties of membranes modified by acrylic acid with silver nanoparticles

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ABSTRACT

Organic fouling is a very important problem in case of membrane filtration processes. Partially, impact of fouling might be overcome by: back puls, membrane cleaning, cross-flow filtration, or surface modification. In this paper, first, surface modification of membrane by acrylic acid and then silver nanoparticles will be presented. In the first step of modification, acrylic acid is grafted to the surface of the polypropylene capillary membrane, thanks to Fenton-type reaction. Then, membranes are further modified by the synthesis of silver nanoparticles directly on the membrane surface. It is well known that silver nanoparticles exhibit antibacterial properties for micro-organisms such as *Escherichia coli* and *Bacillus subtilis*. Also the presence of acrylic acid on the surface of the membrane should reduce adhesion of particles to the membrane surface. In the present work, results obtained for acrylic acid grafting will be presented including FT-IR analysis and the amount of grafted carboxylic groups. Results for membranes further modified by silver nanoparticles, as well as tests for antibacterial properties of such membranes, will be presented. Antibacterial properties of modified membranes were tested on two model gram positive and gram negative bacteria: *E. coli* and *B. subtilis*. Tests were performed in liquid and solid Lysogeny Broth. The presented membranes exhibit very good antibacterial/bacteriostatic properties.

Keywords: Membrane modification; Fenton-type reaction; Acrylic acid; Silver; Antibacterial

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