

# Comparative study of the performance of three cross-flow ceramic membranes for water treatment

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## Abstract

Several tests using water as effluent are used to analyse the performance of three types of microfiltration cross-flow ceramic membranes. Two of these membranes are commercial (Atech and Membralox/US Filter) and the third one is experimental. The main differences between them lie in their chemical composition (different origin of raw materials) and in their manufacturing process.

The results presented here show the dominant effect of the filtering and the gel layer. Both are formed during operation acting as equalising agent between the three membranes. The membranes tested have similar performances in cross-flow operation, although permeability rates for the membrane Membralox/US Filter were about 15% higher. This increase might be due to the smoother surface formed by a second filtering ultrafiltration layer (0.01  $\mu\text{m}$ ) of 10  $\mu\text{m}$  width, which probably contributes to a decrease in the thickness of the gel layer formed during operation.

Using specific raw materials (non-industrial) as well as a second ultrafiltration layer improves the results in operation (performances and cleaning intervals). However, they are uneconomical because of the extra costs involved.

In conclusion, low-cost membranes can achieve similar results to the commercial and more expensive ones opening up their application to new uses and emergent markets.

**Keywords:** cross-flow, ceramic membrane, filtration, permeability