



## New ceramic microfiltration membrane from Tunisian natural sand: application for tangential wastewater treatment

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Received 8 January 2017; Accepted 6 May 2017

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### ABSTRACT

New ceramic supports from low-cost natural Tunisian sand have been prepared and characterized. Plastic paste has been prepared from sand powder (average particle size  $\approx 100 \mu\text{m}$ ) mixed with organic additives and water. The obtained paste has been extruded to porous tubular supports. After firing at  $1,250^\circ\text{C}/3 \text{ h}$ , the support has shown a porosity of 44.72% and an average pore diameter of  $10.36 \mu\text{m}$ . SEM analysis has shown smooth and cracks-free surface of the tubular supports. The tubes have displayed good chemical and mechanical properties. The water permeability of the sand support sintered at  $1,250^\circ\text{C}/3 \text{ h}$  has been  $3,611 \text{ L/h m}^2 \text{ bar}$ . Microfiltration layer has been also prepared from the same natural sand powder (average particle size  $<50 \mu\text{m}$ ) by the slip casting method using a mixture of powder sand, water and polyvinyl alcohol solution. The water permeability of the microfiltration membrane sintered at  $1,100^\circ\text{C}/3 \text{ h}$  has been  $1,228 \text{ L/h m}^2 \text{ bar}$ . The obtained microfiltration membrane has been tested for the treatment of cuttlefish effluent. The membrane has displayed better separation performance in terms of chemical oxygen demand and turbidity removal.

*Keywords:* Ceramic support; Tunisian sand; Extrusion; Microfiltration membrane

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