



Nanofiltration and reverse osmosis of pig manure: Comparison of results from vibratory and classical modules

Sz. Kertész^{a*}, S. Beszédes^b, Zs. László^b, G. Szabó^b, C. Hodúr^b

^a*School of Environmental Sciences, University of Szeged, Dugonics tér 13, Szeged H-6720, Hungary
Tel. +36 203549618; Fax +36 62546034; email: kerteszmk@mk.u-szeged.hu*

^b*Department of Mechanical and Process Engineering, University of Szeged, Moszkvai krt 5-7, Szeged H-6725, Hungary*

Received 16 July 2009; Accepted 3 December 2009

ABSTRACT

The use of membrane technology is a good possibility for the concentration of manure into a small volume that can be transported to the fields. The disposal of manure often requires pre- or post-treatment with respect to environmental legislation. Membrane processes would be a good way to achieve these requirements. In pressure-driven membrane processes, microfiltration and ultrafiltration are usually efficient in concentrating the nutrients associated with particles, such as phosphorus, but for other constituents, e.g. ammonia and potassium, the retention requires nanofiltration (NF) or reverse osmosis (RO). In this study, two different membrane processes, a classical cross-flow (3DTA) and a vibratory shear-enhanced process (VSEP) were compared as regards the reduction of the total volume and the dry matter from pig manure. Two NF and two RO membranes were used. The fluxes were compared during the tests of pretreated manure concentration. Each composite membrane was tested with regard to the membrane, gel layer and porous resistances. It was found that the gel layer was much lower in the case of the VSEP, because of the high shear-enhanced forces on the membrane surface during the experiments. Our results indicated that NF and RO were suitable for pig manure treatment.

Keywords: Manure; Nanofiltration; Reverse osmosis; VSEP; Fouling; Membrane resistance; Gel layer resistance; Total resistance

* Corresponding author.