24 June 2021 (Thursday)

4.00pm-5.30pm (SGT) (GMT +8)
Session 2.3 – Membranes - Fast Forward

Session Chair(s): Yang Min, Chinese Academy of Sciences (China)

Effect Of Stabilized Chlorine-Based Agent In Controlling Biofilm Formation And Its Impact On Reverse Osmosis (RO) Membrane Degradation

LN. Sim, JS. Ho. Nanyang Technological University (Singapore)

Chlorosulfamate has been proven to penetrate biofilm more readily than the alkaline hypochlorite and this makes it a suitable candidate as biofouling control agent. In this study, a short-term intermittent dosing regime was evaluated using the batch test. The results demonstrated that 0.5 h exposure of chlorosulfamate-based agent and 3.5 h break cycle could effectively suppress the bacterial cell growth and protein production on the membrane surface. This short-term intermittent dosing strategy could potentially reduce the chemical cost and discharge levels, if being applied in the seawater reverse osmosis (SWRO) desalination process. Another important feature which makes the chlorosulfamate-based agent an ideal candidate for biofouling control is its negligible impact on the polyamide skin layer of RO membrane as shown in the accelerated exposure test.

A Novel Hollow Fiber Nanofiltration Membrane For Domestic Water Application

ET. Saw, Y. Tang, J. Liu, W. Wang. Century Water Systems & Technologies Pte Ltd (Singapore)

Nanofiltration (NF) is defined as a filtration technology involving a pressure driven membrane with pore size in the range of about 0.5nm to 5nm in diameter. NF membrane has good potential in the water treatment area. One of the important applications for NF membrane is to remove hardness from source water to provide healthy water for drinking. So far, most commercially available NF membranes are made from interfacial polymerization and exhibited negative charge. This kind of NF membrane is unsuitable for hardness removal. A novel NF hollow fiber membrane has been designed and developed by Century Water Systems & Technologies Pte. Ltd. This novel hollow-fiber NF membrane has positive-charged surface demonstrating higher flux and higher rejection of Mg2+ and Ca2+ up to 94%.This hollow-fiber NF membrane also exhibits advantage as higher packing membrane area and lower operation pressure while treat the same sources of water.

Monitoring The Integrity Of Reverse Osmosis Membranes Using Novel Indigenous Freshwater Viruses And Bacteriophages

E. Cornelissen, T. da Silva, B. Blankert, L. Heijnen, E. Beerendonk, L. Hornstra, G. Medema. KWR Water Research Institute. Ghent University (The Netherlands)

The lack of a fast and easy membrane integrity test method without dosing of surrogates with a log removal value (LRV) >3 hampers the implementation of NF/RO membranes. This study describes the use of indigenous viruses, naturally present in surface waters to monitor the integrity of RO membranes in a pilot installation. Natural viruses were identified by using metagenomics and qPCR primers in surface water in the feed and permeate of a pilot RO installation. The LRV of these natural viruses was compared to LRV of spiked MS2 and on-line conductivity. The natural viruses concentration in the source water was >7 comparable to spiked MS2. After inflicting damage to the membrane element, both natural viruses and MS2 detected the damage with a nearly identical LRV decrease. This novel method enables monitoring of RO membrane integrity at high sensitivity (LRV > 7), without the addition of chemical or biological virus surrogates.