

Operation of MBR membrane modules used in a decentralised wastewater treatment plant: Field study and comparison of different cleaning strategies

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ABSTRACT

Due to their compact design and their high quality and reliable treatment, package or containerised membrane bioreactor (MBR) units are used for decentralised and semi-decentralised wastewater treatment plants. The operational availability, performance and economical viability of these MBR systems depend on the filtration performance of the membrane modules. Current chemical cleaning strategies of MBR modules, based on regular (weekly) maintenance cleanings and/or occasional (quarterly to biannual) intensive cleanings proved not to be adapted to semi-central MBR applications (100 up to 1000 p.e.): regular maintenance cleanings require automation and lead to too much care and personnel requirement. Occasional intensive cleanings increase the operational risk of membrane fouling and low cleaning recovery. In addition, semi-central MBR applications are often designed with at least two redundant filtration lines. An alternative chemical cleaning strategy was therefore proposed, implemented and assessed in a containerised MBR unit serving a population of about 250 p.e.: at a given time, only one filtration line is in operation while the other one soaks in a low-grade chemical solution. The modules are switched alternately on a monthly basis. To identify a cleaning strategy and an agent showing a good recovery, one of the modules was cleaned with H₂O₂, while the other was cleaned with NaOCl. A cleaning step with citric acid is added when necessary. These cleanings were tested over 16 months with the goal to minimise maintenance effort and chemicals used.

Keywords: MBR; Cleaning strategies; Hydrogen peroxide; Decentralised WWTPs

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