



## Start-up of decentralised MBRs Part II: the use of additives as initial inoculum

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### ABSTRACT

This paper corresponds to the second part of a study aiming to establish the best conditions to start-up decentralised membrane bioreactors. The first part focused on the impact of different operational parameters on the start-up, whereas this second part aims to find a substitute for activated sludge to serve as initial inoculum. Both low powdered activated carbon addition and Alumin 7 (alkaline coagulant) demonstrated a low performance in terms of filterability and operation. In turn, ferrous chloride ( $\text{FeCl}_2$ ), due to its ability to coagulate soluble and colloidal matter, was able to create a cake layer composed of large coagulated particles acting as a prefilter. Additionally, the combination of wastewater plus  $\text{FeCl}_2$  allowing sufficient contact time before the filtration starts has demonstrated to be the best way to start-up decentralised membrane bioreactor using this additive. Eventhough some drawbacks are associated with its high acidity, i.e. low pH, high conductivity and low  $\text{NH}_4^+$ -N removal, the excellent filterabilities observed and the possibility to create a cake layer from “zero-biomass” convert this additive as a possible substitute for activated sludge. This is supported by particle size distribution measurements suggesting that the negative effects of fine particles are outweighed by the possibility of creating a cake layer that impedes pore blocking.

*Keywords:* Start-up; Decentralised MBR; Additives

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