SESSION 1: INNOVATIVE BIOFILM AND GRANULAR PROCESSES

PRESENTATIONS

IS KN1 From Failures To Successful Granular Sludge Process: Hints For Real Wastewater Treatment Under Coastal Warm Climate

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Granular sludge technology for municipal wastewater treatment expands worldwide. Sewage composition and climate differ geographically, impacting granulation and biological nutrient removal (BNR). Process implementation requires investigating under local settings. Impact of low-strength domestic wastewater and warm climate on granular sludge physical properties and nutrient removal was studied at pilot scale. Two SBR were tested, involving (i) pulse feeding followed by an idle period and (ii) slower up-flow feeding, both prior to aeration. Slower static feeding was beneficial for hydrolysis of particulate organic matter, biomass accumulation, and P-removal. Along with microbial ecology principles, keys for successful engineering will consist in the management of well-functioning (i) anaerobic selector for COD uptake and (ii) aeration control to limit endogenous respiration while enhancing nitrogen removal. Parametrization of cycle configuration is conducted for higher water quality.

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OP1 Formation Of Aerobic Granular Sludge During The Treatment Of Industrial Chemical Wastewater

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Aerobic granular sludge (AGS) has been proven to be a significant step forward in biological wastewater treatment. The system is getting increasingly used for the treatment of domestic wastewater, although formation of granules in industrial applications needs more research. In this study, a chemical industrial wastewater from the harbour of Antwerp (Belgium) was used to turn poor settling sludge over into granular sludge. Two reactor setups were used, a completely aerated sequencing batch reactor (SBR) with a feast famine regime and a SBR operated with an alternating anaerobic feast/aerobic famine strategy. In both reactors granulation was reached after 30 days. After a stable period, reactor operation was changed and organic loading of the sludge was changed. As a conclusion of this research it is shown in that the influent composition plays a key role in the stability of the granules.

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OP2 Unique Mechanisms Of Pore Formation In MABR Biofilms, And Its Effects On Process Performance

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The membrane-aerated biofilm reactor (MABR) is a novel wastewater treatment technology based on air-supplying, hollow-fiber membranes. Biofilms naturally form on the membrane surface, providing nitrification and denitrification, and allowing up to 100% oxygen transfer efficiencies. In this work, we showed that certain operating conditions promote the formation of pores or voids within MABR biofilms. This was determined via advanced imaging techniques, microelectrodes and modelling. Our results suggest a link between metabolic activity and pore development. Large pores form in the interior of the biofilms when the bulk-supplied substrate become rate limiting within the biofilm. Pores may result from unique growth patterns within the biofilm, or from special modes of decay and predation. Understanding the dynamics of a pore development can help to identify critical operational conditions, which could explain some bench, pilot and full scale observations.

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