

X-Pearl® Technology Aerobic Granular Sludge Formation in Continuous-Flow Systems

Advancing biological wastewater treatment through innovations and emerging developments will contribute to lower energy costs, reduced footprint, better performance (e.g. nutrient removal) and efficiencies (e.g. solids management). In a contrary long successful application history of the conventional activated sludge (CAS) process, however, sludge settling has been one of the most common challenges and bottlenecks in any activated sludge system design and operation.

Among numerous efforts on improving the sludge settling and treatment efficiency, aerobic granular sludge (AGS) is a novel and promising technology and has been commercialized in many full-scale sequencing batch reactor (SBR) systems worldwide. Beside its excellent settling ability, AGS shows other advantages such as, dense and strong microbial structure, high biomass retention, ability to withstand a high organic loading rate and tolerance to toxicity compared with conventional activated sludge. To date, all aerobic granulation studies and commercial products were carried out in SBR systems to take advantage of their versatility in operation. Very few studies and products are successful in promoting AGS in

continuous-flow biological wastewater treatment system, which represents the majority process configuration in existing wastewater treatment facilities.

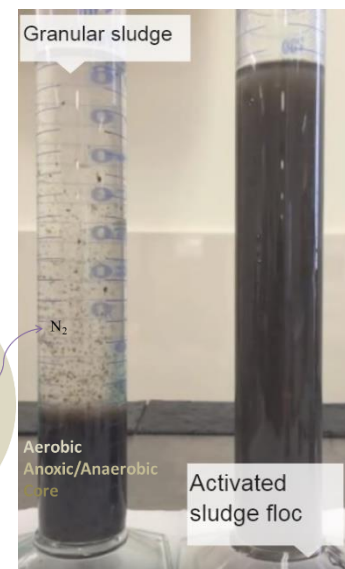
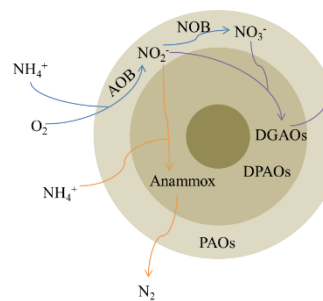


Figure: X-Pearl® Aerobic Granular Sludge – Fast Settling

The identified end technology/product, X-Pearl® (Continuous-Flow Granulation Unit), is an add-on process unit operation, which promotes the formation of AGS and address the granulation mechanisms in continuous-flow systems (CFS). Successful implementation of the developed unit product in existing or new biological treatment process is expected to generate excellent sludge settling ability with additional nutrient removal efficiency by converting the suspended activated sludge flocs to granular sludge. The developed technology will be beneficial to a variety of industrial and municipal wastewater treatment applications. It is the primary goal of the project to advance the X-Pearl® in retrofit of the existing activated sludge process to enhance its performance and increase its capacity with relatively lower capital investment comparing to conventional technologies.

Advancing developments on AGS in a CFS will contribute important innovations and improvements to biological wastewater treatment in Canada where we lag and add to Canada's long history on wastewater treatment in areas such as the development of membrane technology and in UV. The results generated from this project will be directly generate practical commercial product design and management tools for the application of aerobic granular sludge formation in continuous flow system to the North America and Asian Pacific markets.