Aerobic Granular Sludge Technology: its application, resource recovery and future

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Short Biography

Gulsum Yilmaz is Professor of Environmental Engineering at Istanbul University-Cerrahpasa. She holds BSc, MSc and PhD degrees in Environmental Engineering from Istanbul Technical University. She did her post-doctoral studies at The University of Queensland, Australia. Her specific research interests are in environmental biotechnology, biological wastewater treatment, aerobic granular sludge technology, resource recovery and bioregeneration. She has been funded for several research projects from government and industry. She has a patent and patent applications on resource recovery. Selected papers:

Karakas, I., Sam, S.B., Cetin, E., Dulekgurgen, E., Yilmaz, G. Resource recovery from an aerobic granular sludge process treating domestic wastewater. Journal of Water Process Engineering, 34 (2020).

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Abstract

Aerobic granular sludge (AGS) technology is a novel biotechnological process, which has great potential for the wastewater treatment due to many advantages such as good settling ability, high and stable rate of metabolism, high biomass retention and resilience to high-strength wastewater and shock load. Biological cells can be aggregated into a compact form without a carrier in sequencing batch reactor (SBR). AGS is distinct from conventional activated sludge (CAS) systems in physical, chemical and microbiological properties. Aerobic granule is a novel microbial community which allows simultaneous removal of carbon, nitrogen, phosphorus and micro-pollutants such as pharmaceuticals and personal care products, recalcitrant or toxic xenobiotic compounds and metal ions in a single sludge system. It's main advantages, i.e. a smaller process footprint, quicker sludge settling and reduced energy demand, resulted in a rapid market acceptance from promising innovation to a mature technology, capable of competing with established conventional wastewater treatment technologies. The systems integrated with AGS also offer opportunities for resource recovery that water, energy, biopolymers and struvite can be recovered. AGS or Nereda® technology is applied at full scale since 2005. Currently, there are over than 70 Nereda® wastewater treatment plants in operation or under construction worldwide. AGS technology could be the better choice for both new treatment plants and capacity extension of existing wastewater treatment plants in the near future.