

Sustainable wastewater treatment using aerobic granular sludge and opportunities for resource recovery

Dr. Oliver Iorhemen¹

Water is vital to life and its quality is one of the major determinants of our health. From the daily usage of water for various activities such as bathing, cooking, laundry, etc, wastewater is generated in large quantities. To protect human and environmental health, wastewater must be treated to remove the pollutants prior to discharging into the environment. Biological wastewater treatment is an established cost-effective treatment option to remove wastewater pollutants. Currently, the International Water Association considers aerobic granular sludge (AGS) as one of the most promising biological wastewater treatment technologies of the 21st century due to its strong potential to revolutionize the wastewater management industry. Aerobic granules, with a size range of 0.2–5 mm, are a dense colony of different strains of microorganisms held together by extracellular polymeric substances secreted by the bacterial cells under special operational conditions. Compared to the conventional activated sludge process, AGS exhibits outstanding settleability, high biomass retention, small footprint requirement, high resilience to toxic chemicals, energy savings, strong microbial structure, and good ability to handle high organic as well as shock loading rates. The presentation covers granule formation, mechanisms of pollutant removal, various applications of AGS, and the recovery of various resource streams from AGS systems.

¹UNBC School of Engineering, University of Northern British Columbia, Prince George, B.C., V2N4Z9, Canada (oliver.iorhemen@unbc.ca).