Review

Aerobic granular sludge technology: mechanisms of granulation and biotechnological applications

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Aerobic granular sludge technology: mechanisms of granulation and biotechnological applications

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Abstract

Aerobic granular sludge (AGS) is a novel microbial community which allows simultaneous removal of carbon, nitrogen, phosphorus and other pollutants in a single sludge system. AGS is distinct from activated sludge in physical, chemical and microbiological properties and offers compact and cost-effective treatment for removing oxidized and reduced contaminants from wastewater. AGS sequencing batch reactors have shown their utility in the treatment of abattoir, live-stock, rubber, landfill leachate, dairy, brewery, textile and other effluents. AGS is extensively researched for wide-spread implementation in sewage treatment plants. However, formation of AGS takes relatively much longer time while treating low-strength wastewaters like sewage. Strategies like increased volumetric flow by means of short cycles and mixing of sewage with industrial wastewaters can promote AGS formation while treating low-strength sewage. This article reviewed the state of research on AGS formation mechanisms, bioremediation capabilities and biotechnological applications of AGS technology in domestic and industrial wastewater treatment.

Keywords: aerobic granules; biodegradation; EPS; phosphorus removal; nitrogen removal; sewage.