Accepted Manuscript

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PII: S2352-1864(17)30268-7
DOI: https://doi.org/10.1016/j.eti.2017.12.006
Reference: ETI 183

To appear in: *Environmental Technology & Innovation*

Received date : 10 August 2017
Revised date : 23 November 2017
Accepted date : 22 December 2017

Please cite this article as: Vashi H., Iorhemen O.T., Tay J.H., Aerobic granulation: A recent development on the biological treatment of pulp and paper wastewater. *Environmental Technology & Innovation* (2017), https://doi.org/10.1016/j.eti.2017.12.006

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Aerobic granulation: a recent development on the biological treatment of pulp and paper wastewater

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ABSTRACT

The wood pulping process and the production of paper products generate wastewater with a variety of toxic pollutants in high concentrations. Pulp and paper wastewater (PPW) contains complex organic and inorganic pollutants depending on the type of pulping process. This paper provides an overview of biological treatment of PPW. Conventional biological processes such as activated sludge struggle to treat PPW to the required standard. Over recent years, a push towards more innovative solutions such as membrane bioreactors (MBR), sequential batch reactors (SBR), aerated lagoons and anaerobic filters have been suggested for the treatment of PPW. However, these technologies present several operational issues. A novel biotechnology, aerobic granulation, has emerged with strong potential to provide the desired treatment. Compared to activated sludge, granular sludge provides smaller footprints, better settleability, higher biomass retention, tolerance to toxicity, and resistance to shock loading, which are vital to PPW treatment. Early results on the application of aerobic granulation technology for PPW indicate very promising removal. However, pilot-scale testing is required to establish optimal operational conditions.

Highlights:

- Pulp and paper wastewater contains a wide variety of toxic organic and inorganic pollutants.
- Traditional treatment methods struggle to treat this type of wastewater.
- Aerobic granulation has the potential to overcome the complexities of pulp and paper wastewater.

Keywords:

Aerobic granulation; biological treatment; pulp and paper mill effluent; wastewater

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Abbreviations:

adt – air dry tonne of pulp contains exactly 9 kg of bone dry fibre and 1 kg of water (i.e. 10% moisture content); PPW – pulp and paper wastewater

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