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Tim Hülsen, Kent Hsieh, Yang Lu, Stephan Tait, Damien J. Batstone

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Simultaneous treatment and single cell protein production from agri-industrial wastewaters using purple phototrophic bacteria or microalgae – A comparison

Tim Hülsen^{a*}, Kent Hsieh^a, Yang Lu^a Stephan Tait^a, Damien J. Batstone^a

^aAdvanced Water Management Centre, Gehrmann Building, The University of Queensland, Brisbane, Queensland 4072, Australia

*Corresponding Author:

Tim Hülsen

Advanced Water Management Centre

The University of Queensland

St Lucia, Brisbane, 4072, Australia

Phone: +61 (0)7 33467209

Fax: +61(0)733654726

E-mail: t.huelsen@awmc.uq.edu.au

Abstract

Resource recovery, preferably as high value products, is becoming an integral part of modern wastewater treatment, with conversion to heterotrophic or phototrophic/photosynthetic microbes a key option to minimise dissipation, and maximise recovery. This study compares the treatment capacities of purple phototrophic bacteria (PPB) and microalgae of five agri-industrial wastewaters (pork, poultry, red meat, dairy and sugar) to recover carbon, nitrogen, and phosphorous as a microbial product. The mediators have different advantages, with PPB offering moderate removals (up to 74% COD, 80% NH₄-N, 55% PO₄-P) but higher yields ($>0.75\text{gCOD}_{\text{removed}}\text{gCOD}_{\text{added}}^{-1}$) and a more consistent, PPB dominated (>50%) product, with a higher crude protein product ($>0.6\text{gCP gVSS}^{-1}$). The

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