

## Accepted Manuscript

Economic and environmental evaluation of nitrogen removal and recovery methods from wastewater

Yanzi Lin, Miao Guo, Nilay Shah, David C. Stuckey

PII: S0960-8524(16)30358-3

DOI: <http://dx.doi.org/10.1016/j.biortech.2016.03.064>

Reference: BITE 16254

To appear in: *Bioresource Technology*

Received Date: 3 February 2016

Revised Date: 8 March 2016

Accepted Date: 10 March 2016

Please cite this article as: Lin, Y., Guo, M., Shah, N., Stuckey, D.C., Economic and environmental evaluation of nitrogen removal and recovery methods from wastewater, *Bioresource Technology* (2016), doi: <http://dx.doi.org/10.1016/j.biortech.2016.03.064>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## Economic and Environmental Evaluation of Nitrogen Removal and Recovery

### Methods from Wastewater

Yanzi Lin<sup>†,1</sup>, Miao Guo<sup>†,1</sup>, Nilay Shah<sup>1</sup>, David C. Stuckey<sup>1,2\*</sup>

1. Department of Chemical Engineering, Imperial College London, London SW7 2AZ, UK

2. Nanyang Environment & Water Research Institute, Nanyang Technological University

<sup>†</sup>Equivalent contribution

\*Corresponding author: [d.stuckey@imperial.ac.uk](mailto:d.stuckey@imperial.ac.uk);

### Abstract

The driver for waste-based economic growth is long-term strategic design, and a paradigm-shift from waste treatment to resource recovery. This study aims to use an integrated modelling approach to evaluate the holistic economic and environmental profiles of three alternative nitrogen removal and recovery methods integrated into wastewater treatment systems, including conventional nitrification-denitrification, Anammox, and the anaerobic ion exchange route, to provide insights into N recovery system designs which are key elements in building a sustainable circular economy. Our results suggest that ion exchange is a promising technology showing high N removal-recovery efficiency from municipal wastewater and delivering competitive sustainability scores. In comparison with the well-developed conventional route, ion exchange and Anammox are undergoing significant research and development; as highlighted in sensitivity analyses, there is considerable room for process design and optimization of ion exchange systems to achieve economically and environmentally optimal performance.

**Keywords:** nitrification/denitrification; Anammox; Ion exchange; wastewater treatment; Life Cycle Analysis (LCA).

Download English Version:

<https://daneshyari.com/en/article/7070908>

Download Persian Version:

<https://daneshyari.com/article/7070908>

[Daneshyari.com](https://daneshyari.com)