

Ss & Xs Calculations from NUR tests

ASaatci

Reference

A METHOD TO ESTIMATE DENITRIFICATION
POTENTIAL FOR PREDENITRIFICATION SYSTEMS USING
NUR BATCH TEST

KATARZYNA KUJAWA* and BRAM KLAPWIJK

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$$r_{D1} = r_{D,S_S} + r_{D,X_S} + r_{D,end}$$

$$r_{D2} = r_{D,X_S} + r_{D,end}$$

$$r_{D3} = r_{D,end}$$

$$r_{D,S_S} = r_{D1} - r_{D2}$$

$$r_{D,X_S} = r_{D2} - r_{D3}$$

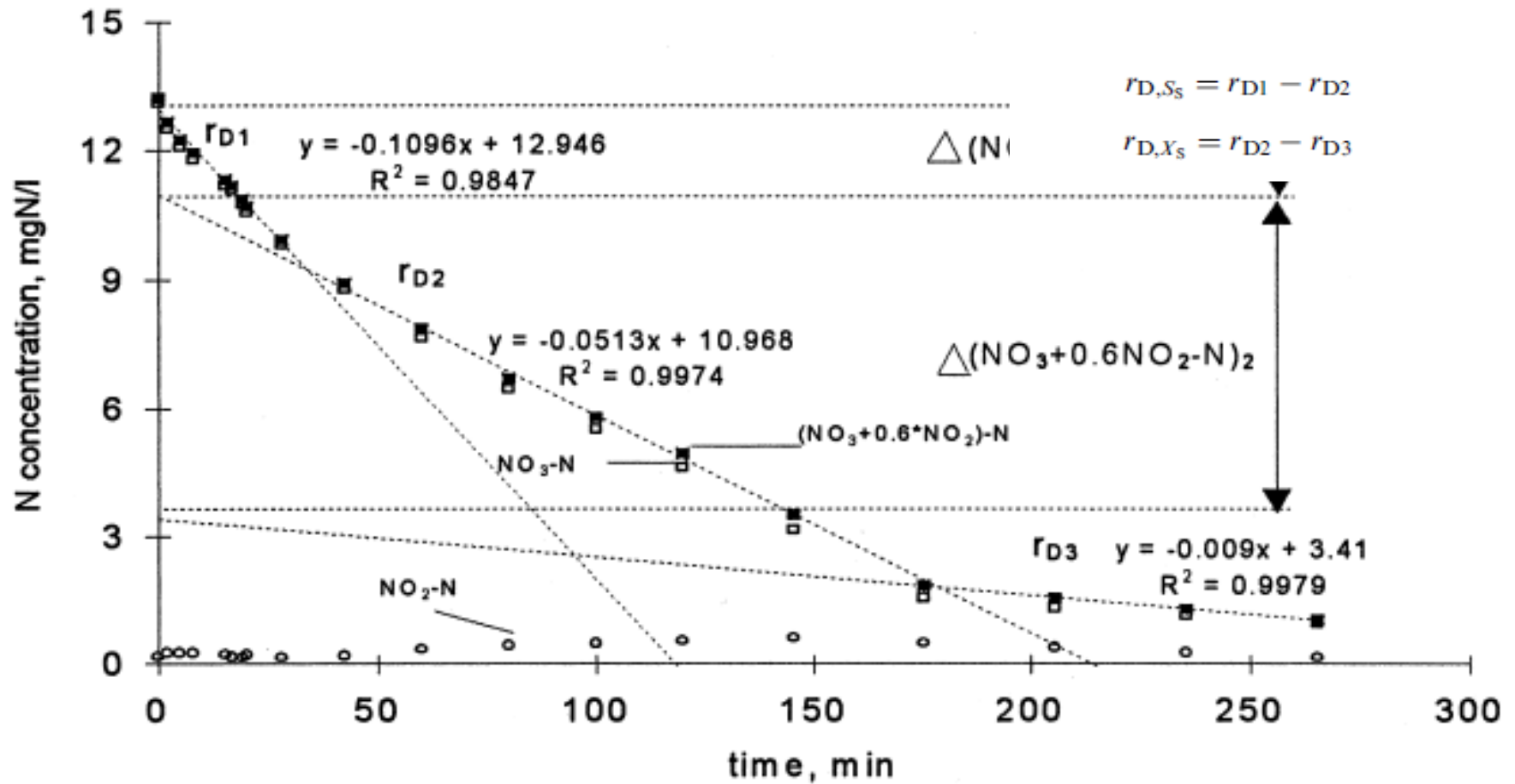


Fig. 1. Course of nitrate after a pulse dose of settled domestic wastewater. ($f_{ww} = 0.29$, $MLSS = 3.6$ g/l, $MLVSS = 2.7$ g/l, $COD_{ww} = 430$ mg/l, $T = 18^\circ C$, $S/X_V = 0.045$ mg COD/mg MLVSS).

$$f_{D1} = f_{D,S_S} + f_{D,X_S} + f_{D,end}$$

$$f_{D2} = f_{D,X_S} + f_{D,end}$$

$$f_{D3} = f_{D,end}$$

$$f_{D,S_S} = f_{D1} - f_{D2}$$

$$f_{D,X_S} = f_{D2} - f_{D3}$$

$$r_{S_1} = \frac{2.86(r_{D1} - r_{D2})}{1 - Y_H}, \text{ mg COD/g MLVSS h}$$

$$r_{X_1} = \frac{2.86(r_{D2} - r_{D3})}{1 - Y_H}, \text{ mg COD/g MLVSS h}$$

Y_H Measurement

$$1 - Y_H = \frac{2.86\Delta(\text{NO}_3 - \text{N} + 0.6\text{NO}_2 - \text{N})_1}{c_{\text{AC},i}}$$

A method to estimate denitrification potential

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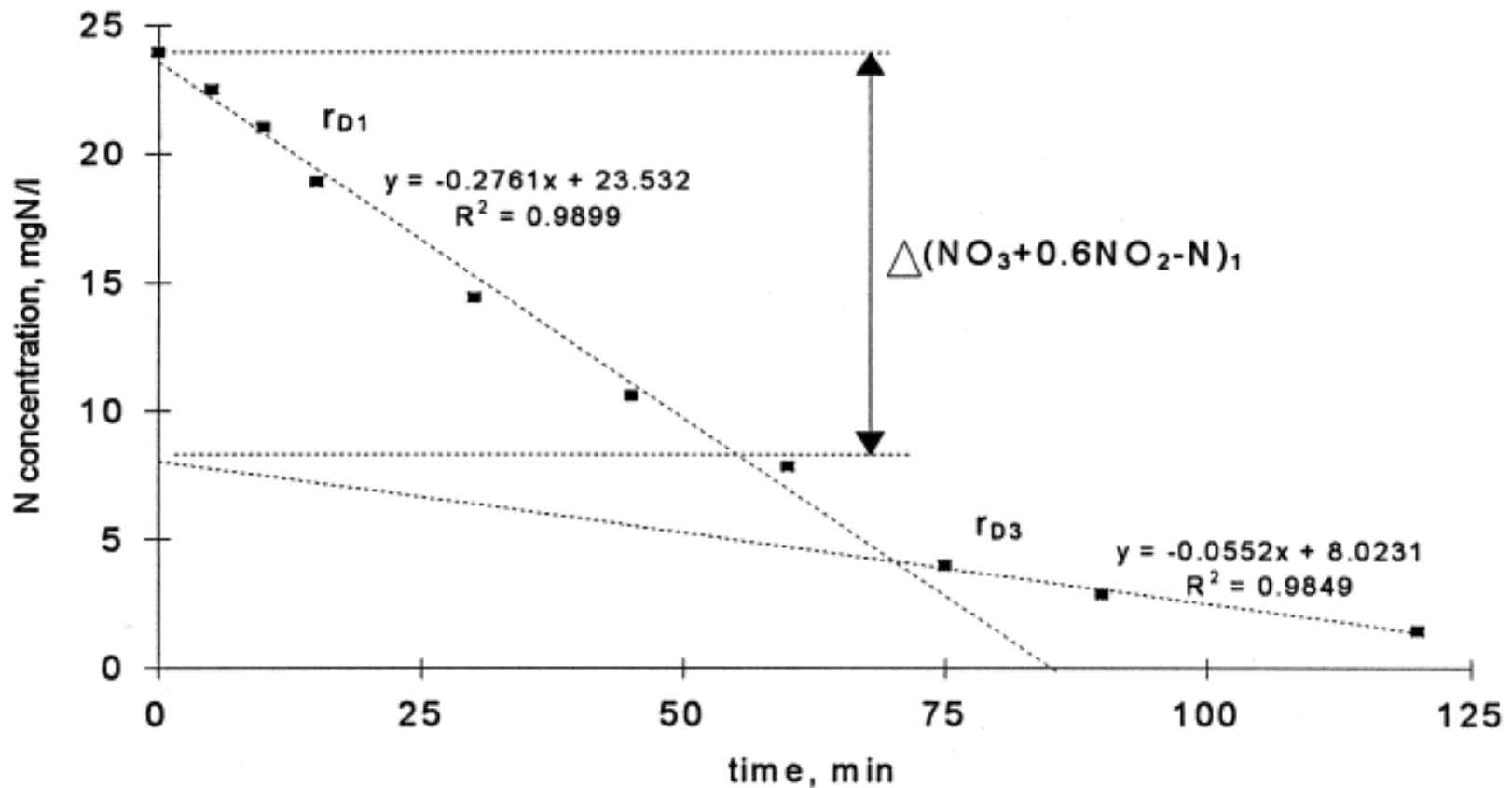


Fig. 2. Course of nitrate/nitrite in a batch NUR test with pulse dosage of acetate (5 ml 1 M

$$S_S = \frac{2.86\Delta(\text{NO}_3\text{-N})_1 - 1.72\Delta(\text{NO}_2\text{-N})_1}{(1 - Y_H)} \frac{1}{f_{\text{ww}}},$$

mg COD/l

$$X_S = \frac{2.86\Delta(\text{NO}_3\text{-N})_2 - 1.72\Delta(\text{NO}_2\text{-N})_2}{(1 - Y_H)} \frac{1}{f_{\text{ww}}},$$

mg COD/l

f_{ww}

= fraction of wastewater volume in the total volume of activated sludge mixed liquor, (-)

