

BIOLOGICAL NUTRIENT REMOVAL AT LOW DISSOLVED OXYGEN

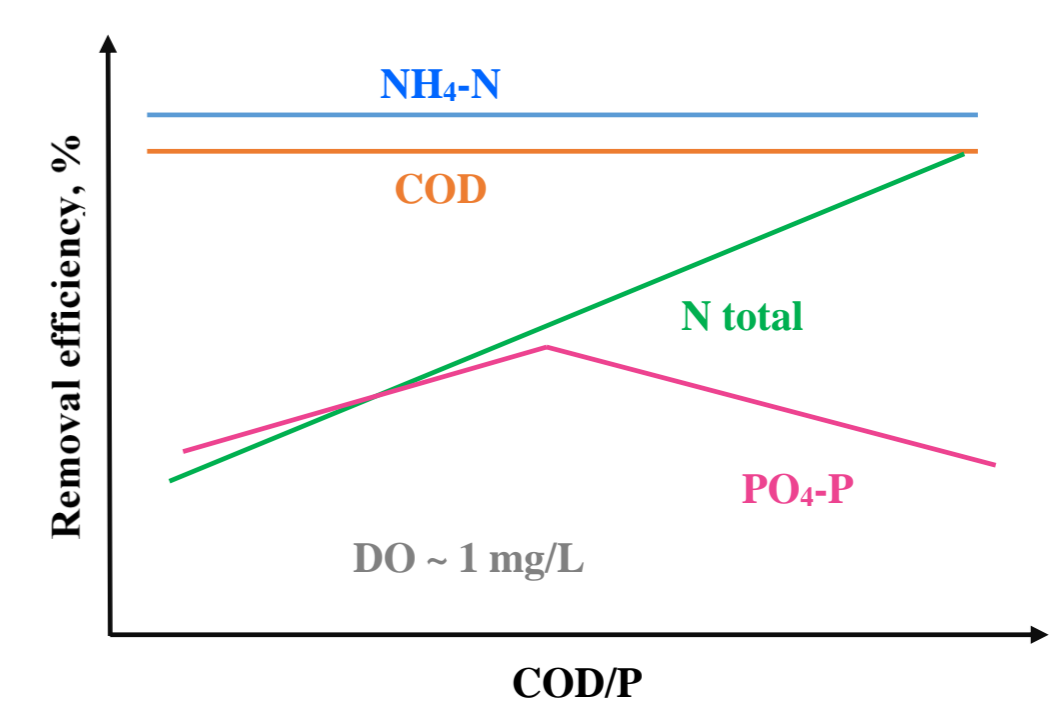
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INTRODUCTION

For simultaneous biological nutrient removal (SBNR) from wastewater are responsible macroenvironment in reactor and microenvironment in microbial biomass – floc microenvironment. Biological nutrient removal process (BNR) at low dissolved oxygen (DO ~ 1mg/L) results in simultaneous removal of C, N and P.

GRAPHICAL ABSTRACT



MATERIAL & METHODS

- ✓ Activated sludge
- ✓ SBR reactor
- ✓ Low dissolved oxygen (DO ~ 1mg/L)
- ✓ COD/P ratio: 18, 25, 32
- ✓ C source: sodium acetate
- ✓ Dissolved oxygen, pH-value, temperature: WTW SenTix 41 and WTW 330i, WTW Dur Ox and WTW 3210 Oxi
- ✓ APHA methods

RESULTS

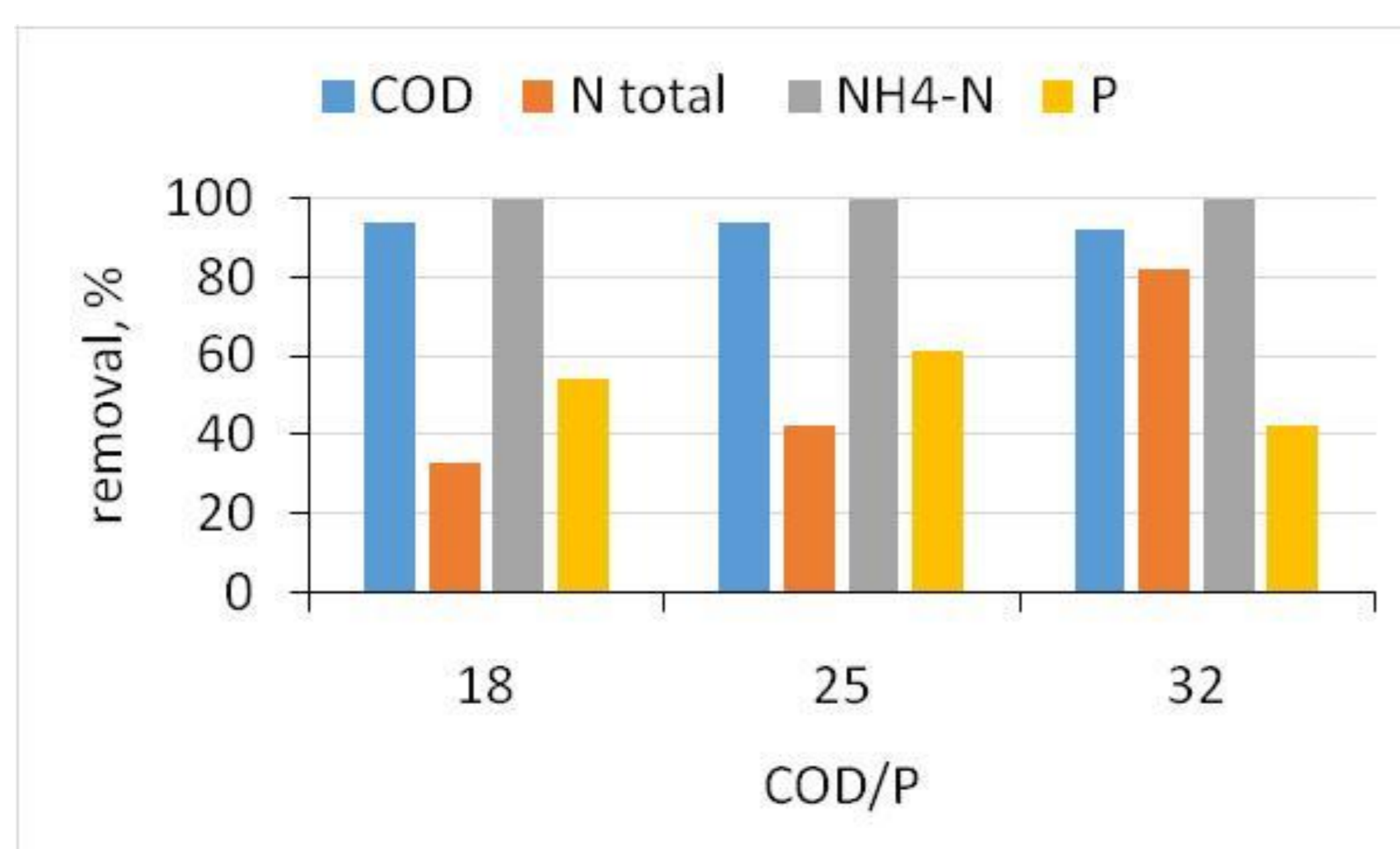


Figure 1. Removal efficiency of COD, N_{total}, NH₄-N and PO₄-P in biological nutrient removal process at low dissolved oxygen and COD/P ratios 18, 25 and 32.

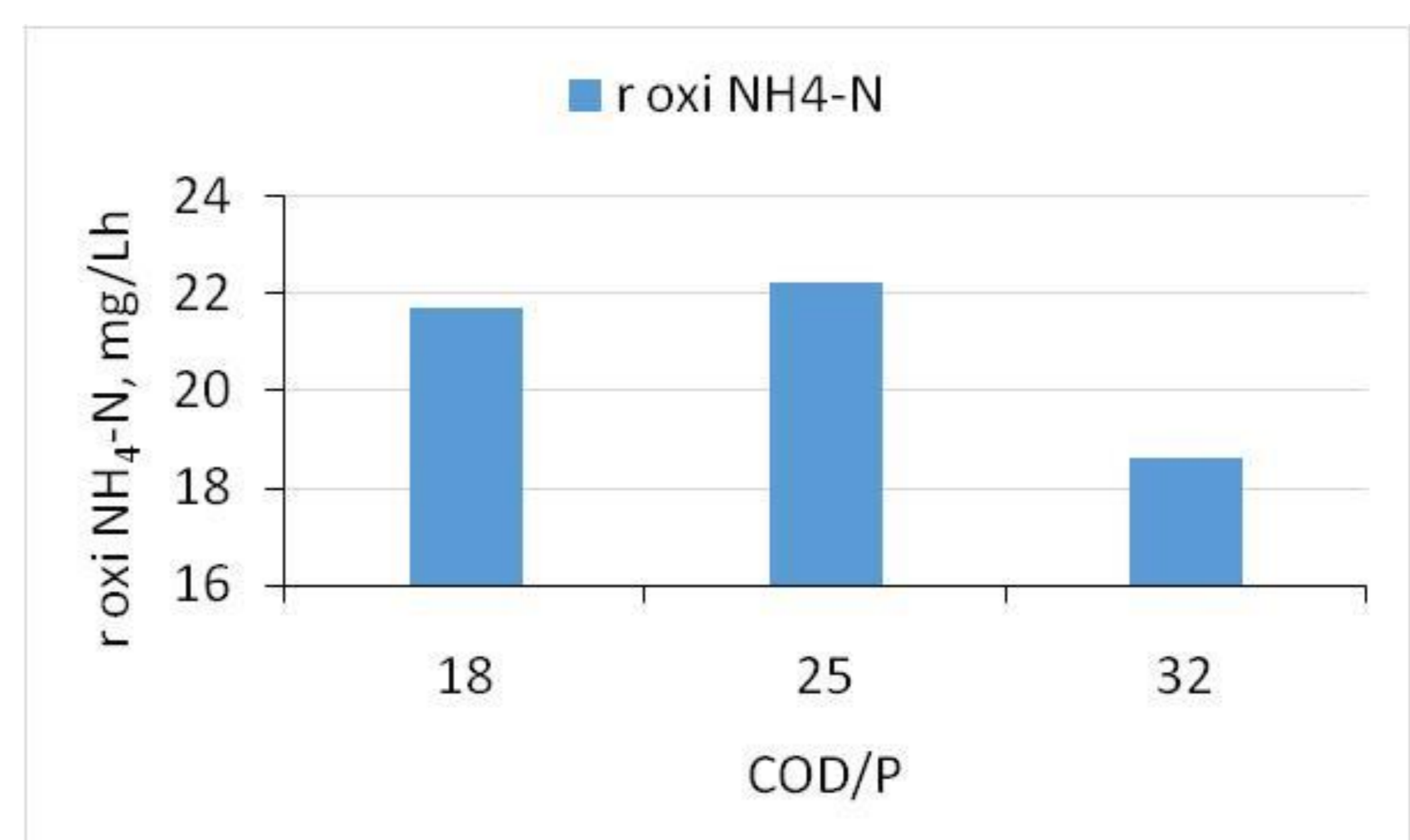


Figure 2. NH₄-N oxidation rate in biological nutrient removal process at low dissolved oxygen and COD/P ratios 18, 25 and 32.

CONCLUSIONS

Biological nutrient removal process (BNR) at low dissolved oxygen (DO ~ 1mg/L) results in simultaneous removal of C, N and P.

At all investigated C/P ratio the removal efficiency of organics (COD) was ≥ 95% and ammonium (NH₄-N) 100%. Total nitrogen (N_{tot}) removal efficiency increased with increasing of C/P ratio, and at COD/P 32 the N removal was 86%.

Phosphate removal efficiency of 54%, 61% and 42% was achieved at COD/P ratios of 18, 25 and 32, respectively.