

## MOLASSES AS A CARBON SOURCE FOR DENITRIFICATION

DOROTA KULIKOWSKA, KAROLINA DUDEK

**Abstract:** The paper presents the results of an experiment with sugar-industry waste (molasses) as an organic carbon source for denitrification. The investigations concern the influence of untreated molasses and molasses after pretreatment (hydrolyzed molasses) and variable COD/N ratio (6.0; 5.0; 4.0) on denitrification efficiency and kinetics. Moreover, sludge production, in dependence on tested carbon source, was estimated. At COD/N ratio 6 and 5, regardless of applied organic carbon source (untreated molasses, hydrolyzed molasses), the denitrification efficiency was over 98%. However, from kinetic analysis it results that a kind of carbon source and COD/N ratio have an effect on denitrification rate. The highest nitrate removal rate –  $9.5 \text{ mg N}_{\text{NOx}}/(\text{dm}^3 \cdot \text{h})$  was obtained at COD/N = 6 in the reactor with hydrolyzed molasses as a carbon source and the lowest –  $5.14 \text{ mg N}_{\text{NOx}}/(\text{dm}^3 \cdot \text{h})$  in reactor with untreated molasses at COD/N = 5.0. The lowering of COD/N ratio to 4 caused decrease of the process efficiency to 27.6% (untreated molasses) and 44.3% (hydrolyzed molasses). Hydrolyzed molasses as a carbon source caused higher production of activated sludge. In reactors with untreated molasses  $Y_{\text{obs}}$  equals  $0.40 \text{ mg VSS/mg COD}$  at COD/N ratio 6 and  $0.31 \text{ mg VSS/mg COD}$  at COD/N ratio 5. In reactors with molasses after hydrolysis  $Y_{\text{obs}}$  were 1.35-fold and 1.5-fold higher, respectively. Since, the molasses hydrolysis results in rising costs of wastewater treatment and cause higher sludge production, untreated molasses seems to be a more suitable carbon source for denitrification.