

Scientific Paper:

Journal of Environmental Engineering Vol. 133, No. 6, 2007

Effects of Iron on Chemical Sulfide Oxidation in Wastewater from Sewer Networks

Asbjørn Haaning Nielsen¹, Thorkild Hvitved-Jacobsen² and Jes Vollertsen³

¹Assistant Professor, Dept. of Biotechnology, Chemistry and Environmental Engineering, Aalborg Univ., Sohngaardsholmsvej 57, 9000 Aalborg, Denmark. E-mail: ahn@bio.aau.dk

²Professor, Dept. of Biotechnology, Chemistry and Environmental Engineering, Aalborg Univ., Sohngaardsholmsvej 57, 9000 Aalborg, Denmark. E-mail: thj@bio.aau.dk

³Associate Professor, Dept. of Biotechnology, Chemistry and Environmental Engineering, Aalborg Univ., Sohngaardsholmsvej 57, 9000 Aalborg, Denmark. E-mail: jv@bio.aau.dk

Abstract:

Effects of iron on the kinetics and stoichiometry of aerobic chemical sulfide oxidation in wastewater from two different sites were studied at pH 8 and 20°C. Iron(III) chloride was added to the wastewater in concentrations of up to 20 g Fe m⁻³. The rate of aerobic chemical sulfide oxidation increased linearly with the iron(III) additions resulting in equal effects with wastewater from the two sites. Despite the significant effect of the iron(III) additions, the background concentrations of iron cannot explain the significant temporal and spatial variability of aerobic chemical sulfide oxidation kinetics reported in this study and in the literature. In this respect, other metals are probably also important. In addition to the impacts on the oxidation kinetics, the iron(III) additions resulted in a change of the oxidation stoichiometry. With increasing amounts of iron(III) added to the wastewater, less dissolved oxygen was required for the sulfide oxidation.

Key-words: Iron, oxidation, wastewater management, sewers