



Conceptual basis for the appropriate design of biological wastewater treatment systems: drawbacks of existing prescriptions

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ABSTRACT

The paper reviews and evaluates the basic steps in designing activated sludge systems based on process stoichiometry and mass balance. Appropriate system design requires the use of biodegradable COD as the main parameter, which sets a balance between substrate utilized, biomass generated and oxygen consumed. In practice, this balance is easily translated into excess sludge production and oxygen requirement. The evaluation first covers the necessary database for a rational design approach, with emphasis on relevant domestic wastewater characterization. Then it defines the excess sludge production, together with the daily oxygen demand. Principles outlined are illustrated in a numerical design example where the proposed rational approach is compared with the German Design Guidelines, A-131 for organic carbon removal.

Keywords: Activated sludge; Chemical oxygen demand; Endogenous decay; Mass balance; Process design; Stoichiometry; Yield coefficient

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