

Parravicini V., Lindtner S., Nowak O., Svardal K., Kroiss H. (2004): Application of different Sludge Disintegration Methods to enhance the Stabilisation Degree of digested Sludge: Cost-Benefit Analyses on the Basis of Lab-Scale Experiments at a municipal Waste Water Treatment Plant, IWA World Water Congress, Marrakech , Marokko

**ABSTRACT:** Laboratory experiments were performed to investigate to what extent the organic content of anaerobically digested sludge, stabilised at high solids retention times (SRTs), can be reduced by the application of sludge disintegration followed by a further stabilisation step. In particular, among the various sludge disintegration methods available, the thermal and the alkaline treatment as well as sludge ozonisation were studied. For this purpose anaerobically stabilised sludge (SRT=30d) was collected at a municipal waste water treatment plant (WWTP), disintegrated and further digested in lab-scale reactors either under anaerobic or under aerobic conditions. Experimental results indicate that the degradation of volatile suspended solids (VSS) in digested sludge could be only slightly enhanced through sludge disintegration. In particular, thermal treatment and sludge ozonisation were the most effective. Additionally, the degradation efficiency of VSS in the anaerobic lab-scale digesters was found to be lower than under aerobic conditions. Based on the results of the lab-scale experiments a comparison between operational costs and benefits of sludge disintegration was made for the WWTP investigated. Operational costs and benefits resulting from sludge disintegration were also compared with total operational costs at the WWTP. The cost-benefit analysis showed that in the case studied application of sludge disintegration with ozone would not provide any economic advantages. Thus, annual operational costs would rise approx. by 4% and by 6% in the process configurations with anaerobic and aerobic post-stabilisation respectively. For thermal sludge disintegration similar results were obtained. Economic efficiency of sludge disintegration might be higher at WWTPs where sludge digestion is operated at shorter SRTs, due to the higher enhancement of VSS degradation achievable. Additionally, application of sludge disintegration technologies might become cost-effective, if sludge disposal costs increase considerably.