

# Experimental investigations on the influence of physico-chemical parameters on anaerobic degradation in MBT residual waste



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*(Claud Bernhard)*

## EXPERIMENTAL INVESTIGATIONS ON THE INFLUENCE OF PHYSICO-CHEMICAL PARAMETERS ON ANAEROBIC DEGRADATION IN MBT RESIDUAL WASTE

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Cuvillier Verlag Mrz 2011, 2011. Buch. Book Condition: Neu. 211x146x5 mm. Neuware - In this work, MBT residual waste was used for experimental studies to investigate the influence of crucial parameters influencing biochemical processes in anaerobic degradation in residual wastes from MBT. The moisture content is one of the most critical parameters influencing biogas production in waste as well as nutrient transport. Batch experiments were carried out to correlate moisture content and biogas production in MBT residual waste. Moreover, quantification and monitoring of heterogeneous moisture distribution in a landfill body is critical for mechanical landfill stability and landfill gas emission control. For quantitatively monitoring in-situ moisture distribution in MBT residual waste, a novel geoelectrical technique was successfully applied and evaluated on laboratory scale. The pH development in leachate from MBT residual wastes and the relating acid buffering intensity was found to be important for facilitating biochemical conversion of solid organic carbon matter to biogas. At unadjusted conditions, a positive correlation between strength of acidification phase and biogas production, especially methane production, could be found. Thereby, the acid buffer intensity of MBT residual wastes proved to be crucial for pH stabilisation. Due to maximum cumulative biogas production at neutral pH, pH regulation at pH 7 is recommended for waste treatment in MBT plants and landfill bioreactors. The bioavailability of metabolic intermediates was investigated with regard to their sorption behaviour on MBT residual wastes. Alcohols of a homologous series with increasing octanol-water partition coefficients POW were used as surrogates for carboxylic acids. Activated carbon was used as a reference sorption system due to its high specific surface area. By determining the distribution coefficient  $K_D$ , the bioavailability factor  $B_f$  was quantified and denotes that bioavailability of the surrogates was practically unlimited. Transferring these results to intermediates of the anaerobic degradation with similar log POW values, e.g. acetic acid and propionic acid, reveals that biodegradation of certain organic substrates e.g. acetic acid or...

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