



ANAEROBIC DIGESTION (AD) TECHNOLOGY AS AN INTEGRATED PART OF MUNICIPAL SOLID WASTE AND RESOURCE MANAGEMENT IN EMERGING ECONOMIES

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ABSTRACT

Economic growth, increasing urbanization and changing consumer habits have resulted in an ever-increasing amount of Municipal Solid Waste (MSW) in emerging economies, where landfilling of MSW is still the major disposal method. Simultaneously, the disposal of waste becomes more and more difficult due to limited availability of space for landfilling. Moreover, public awareness against setting up new landfills is growing putting more and more pressure to the authorities to find new landfill space in manageable distance of cities and communities, hence making MSW more costly. The high content of organic material in municipal solid waste (up to 60 %) causes numerous problems in handling and disposing of wastes including groundwater pollution, health problems from unhygienic conditions, odor and climate change from the release of landfill gas. Therefore, reducing the amount of organic material in waste prior landfilling is of utmost importance as it reduces the generation of landfill gas, saves landfill space and reduces environmental, climate and social burden. Anaerobic Digestion (AD) as an integrated part of the management of municipal solid waste is a viable solution with multiple advantages such as (1) stabilizing of organic fraction in MSW, (2) energy recovery from the production biogas and (2) a closing of the nutrient cycle. In addition, AD mitigates climate change, reduces environmental and health problems and fosters economic development. Within the scope of the presentation AD systems most applicable for municipal solid waste management will be introduced, including (i) wet continuous system (CSTR and hydraulic reactors), (ii) dry continuous system (horizontal or vertical plug flow reactors) and (iii) dry batch system (garage and percolation). Besides, collection and sorting systems for organic material including feedstock preparation will be discussed and the utilization of biogas and digestate as the key drivers for the AD approach highlighted. Eventually, in the context of overcoming challenges and fostering sustainability and mainstream integration of AD, necessary legal and regulatory framework conditions will be presented and potential support mechanisms discussed.