A review of the upflow anaerobic sludge blanket reactor

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ABSTRACT

The upflow anaerobic sludge blanket (UASB) reactor has found wide acceptance in the treatment of industrial wastewaters since its development in the Netherlands. It has been applied to a wide spectrum of wastewaters on both domestic and industrial scales. This acceptance stems from its simplicity, economy and the possibility of energy recovery. Studies focusing on UASB reactors are numerous; and though conflicting results have been observed, researchers are unanimous when it comes to the efficiency of the reactor in the treatment of high- to medium-strength wastewaters with easily hydrolysable substrate. It has also recorded a level of success in sewage treatment in tropical countries. As much, success has not been recorded in cold climates and in the treatment of wastewaters containing complex or toxic substance. The efforts of numerous researchers have given rise to many variants and modifications of the UASB reactor, which have widened the scope of applicability of this very important facility. This paper presents a concise but comprehensive review of the UASB reactor and studies focusing on it. Key operational issues such as granulation, methanogenesis, hydraulic retention time, efficiency, toxicity, modifications of UASB reactors and biogas recovery were considered using facts and data sieved from literature. This review shows that UASB reactors can be adapted for the treatment of almost any type of wastewater if modified accordingly.

Keywords: UASB; Granulation; Methanogenesis; Biogas; Sludge blanket; Bacteria