Effect of HRT on hydrogen production and organic matter solubilization in acidogenic anaerobic digestion of OFMSW


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HIGHLIGHTS

- The maximum hydrogen production is reached at 1.9-days HRT.
- The maximum solubilized organic carbon concentration is reached at 1.9-day HRT.
- The ratio ASC/DOC allows further interpretation of process limitations.

1. Introduction

The current generation of municipal solid waste (MSW) and the high consumption rate of fossil fuels are environmental problems typical of areas with high population density. Nowadays, the MSW generation represents a serious problem since most of them are deposited in landfills causing negative environmental effects. In Spain, 588 kg per capita are annually collected and this amount is increasing every year [1]. On the other hand, the current reserves of fossil fuels are being depleted very fast due to the growing energy needs [2].

In this sense, many works demonstrated the possibility of coupling hydrogen generation with the use of several organic substrates including waste materials (such as MSW), industrial wastewaters and agro-industrial wastes. This generation of hydrogen from wastes may simultaneously offer environmental and economic benefits in order to meet the growing demand for renewable energy [3–5].

Among these works, anaerobic digestion (AD) processes are considered one of the best options to treat MSW since they may...