

COMPOSTING POTENTIAL OF DIFFERENT INOCULUM SOURCES ON SEBAC SYSTEM IN TREATMENT OF MUNICIPAL SOLID WASTE

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INTRODUCTION

Anaerobic biological treatment of municipal solid waste (OFMSW) in thermophilic conditions has received increased attention due the possibility of producing gas from wastes, and production of useful digester gas and the attenuation of smell (Pavan et al., 1998; Chynoweth et al., 2002).

Among in the processes developed for accelerate anaerobic digestion is the SEBAC process (SEBAC homepage, 2004). This technology consists of two reactors connected, one containing unsorted organic fraction solid waste and another with stabilized organic waste (inoculum source).

The main objective is study the performance of start up phase in SEBAC reactors with two different inoculum sources from OFMSW treatment. The organic waste from the campus restaurant was dried and homogenized to obtain a representative sample the source sorted organic fraction of municipal solid waste (SS-OFMSW) at 35.0% total solid.

MATERIAL AND METHODS

Substrate preparation

Laboratory studies on dry anaerobic digestion of organic fraction of municipal solid waste source sorted (SS-OFMSW) collected in specific of the university restaurant of Faculty of Sea Science & Environmental Sciences of University of Cádiz.

The inoculum sources were: mesophilic digested sludge (MDS) supplied by the Guadalete Wastewater Treatment Plant, (Cadiz, Spain), and a mixture of SS-OFMSW and swine digested waste (SDW), obtained from previous experiment.

The reactors were elaborate with a new configuration conform previous works in the Research Group (Forster-Carneiro et al., 2003). The reactors were kept inside a special room from thermophilic temperature control at 55°C, and daily the leachate recirculated was analyzed.

Analytical methods

The biological process was stable based on total and volatile solid in suspension, pH, alkalinity, ammonia nitrogen, chemical demand carbon, solids, solids suspension, and also based in the production and composition of biogas.

RESULTS AND DISCUSSION

In the start up phase of anaerobic degradation alls reactors (SS-OFMSW, SS-OFMSW/SDW

and MDS) showed satisfactory performance in analytical parameters, adequate to maintain an optimal biological activity. In previous works, the MDS from digester Treatment Plant has shown to be an excellent stabilized organic waste and inoculum source (De la Rubia et al., 2002).

The reactor SS-OFMSW/SDW presented a biodegradability of 35.3% and the reactor MDS of 30.6%, calculated from COD values.

The inoculums SS-OFMSW/SDW and MDS showed in the stable phase a gas production of 7.5 L/day and 16.1 L/day, respectively. The mean methane production of 7.6 CH_4 L/gVSS for SS-OFMSW reactor and 6.5 CH_4 L/gVSS for MDS or proximally of 43.0% CH_4 and 59.0% CH_4 , respectively (Figure 1).

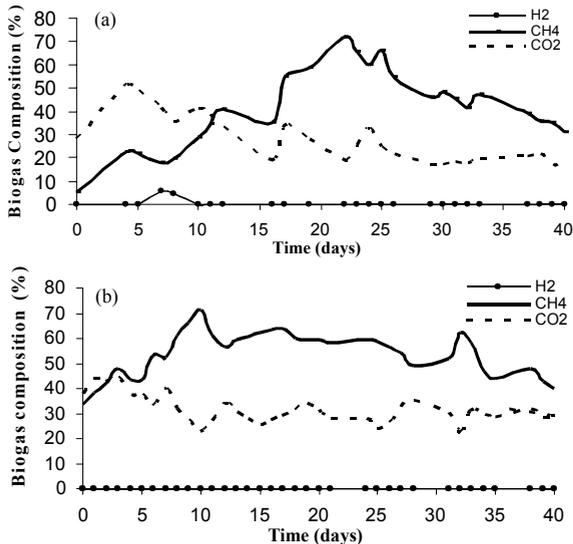


Figure 1. Biogas composition in reactor with SS-OFMSW/SDW (a) and MDS (b) in SEBAC system.

The MDS is a good stabilized organic waste (inoculum) for dry thermophilic anaerobic digestion from OFMSW treatment regarding the SEBAC reactors.

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