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Short Communication

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## Anaerobic co-digestion of dairy cattle manure and pear waste

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### Abstract

Anaerobic co-digestion of pre-treated dairy cattle manure (LCM) with pear waste after a storage period (PLF) was tested at four inclusion levels: 0%, 25%, 75% and 100%. Inclusion levels consisted in the replacement of the volatile solids (VS) from the LCM with the VS from PLF keeping the organic loading rate around  $1.1 \pm 0.4 \text{ g SV L}^{-1} \text{ d}^{-1}$ . The introduction of the co-substrate clearly enhanced methane production rate (MPR) in comparison to single substrate (phase I) as phases II and III, respectively, achieving values 1.3 and 2.8 times higher than phase I. The overall performance was optimized for the mixture 25:75 (LCM: PLF; v:v). Moreover, storage of pear waste did not compromise its use in AD. This fact is important once it can improve waste management from pear production through its valorisation as co-substrate in AD process.

Keywords: Co-digestion, fruit waste, dairy cattle manure, methane yield, waste management.

### 1. Introduction

The large amount of waste produced along the food chain (from agriculture, to industrial processing, retail and household consumption) leads to the need of finding alternative valorisation options, namely extraction of valuable compounds or its use as substrate for energy production. Mirabella et al. (2014) extensively review the options for the valorisation of food processing waste.

Fruit waste (FW) is very rich in organic matter and has a tendency to undergo fermentation what can complicate its management. The most common treatment for FW is composting but several authors have studied the feasibility of using FW as a substrate for anaerobic digestion (AD) (Arhoun et al., 2013; Bouallagui et al., 2003, 2005 and

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