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SPENT COFFEE GROUNDS FROM COFFEE VENDING MACHINES AS FEEDSTOCK FOR BIOGAS PRODUCTION

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Abstract

Large amounts of spent coffee grounds (SCG) are currently available all over the world due to the enormous increase in coffee consumption. This increase has in turn to be related to the even greater diffusion of coffee vending machines. The aim of this study was to evaluate the biomethanation potential (BMP) of SCG alone or in co-digestion with pig slurry (PS). Pig slurry was chosen because it is frequently utilized as feedstock for biogas production from agricultural waste. The raw material was obtained from the SCG-collecting tank of a commercial coffee vending machine. Compared treatments were: SCG, PS and SCG+PS. Depending on the treatment, each reactor (100 mL) contained: 1 g (2%) SCG volatile solids (VS) and 50 mL of hydration medium (in SCG) or PS (in SCG+PS); 50 mL of PS (in PS). A lab-prepared inoculum (10% v/v) was added to each reactor. Biogas production at 35 °C and composition were monitored until exhaustion of the anaerobic digestion (AD). The BMP of SCG was 290 mL CH4 g⁻¹ VS, a value comparable to that of other substrates currently used as ingredients in anaerobic digestion. Using PS instead of hydration medium increased the CH4 production per reactor. We conclude that SCG are a suitable feedstock for biogas production. Our inbatch results suggest also the potential for increasing biogas yields from pig slurry using spent coffee grounds as co-substrates, in continuous systems.

Key words: biomethanation potential, co-digestion, methane, pig slurry, spent coffee grounds

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