



METHANE AND VOLATILE FATTY ACIDS PRODUCTION FROM POULTRY LITTER WITH THE USE OF ENZYMATIC PRE-TREATMENTS

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Anaerobic digestion is a process that occurs in free-oxygen environments, when different microorganisms interact to transform organic matter into biogas and value-added by-products. Since Brazil is the third biggest chicken exporter worldwide, a sustainable management of the waste produced is necessary, with the advantage of producing energy from the methane generated. Considering that poultry litter is constituted of lignocellulosic material and is hard to degrade, the use of pre-treatments for optimal usage is applied. Enzymes act in the hydrolysis process, contributing for the microorganism action during degradation. For this study, it was used poultry litter (CA) at 60% v/v, granular sludge (L) at 10% v/v, and two commercial enzymes – a cellulase (E, at 0,25%, 0,5%, 1% and 2% concentrations), and a pectinase (O, at 0,02%, 0,04%, 0,08%, 0,1% and 1% concentrations). Both enzymes were added to the substrate, then the bioassays were submitted to activation pre-treatment and kept for 30 days. The concentration of biogas generated was measured in gas chromatography and the methane production data was evaluated through the *Gompertz* modified model, using *Statistica* (10.0). For the verification of production and consumption of volatile fatty acids, initial and final samples of the bioassays were centrifuged, filtered through 0,22 μm membranes and diluted in methanol, so that the acids could be identified using gas chromatography. Every bioassay produced methane by the end of 30 days, with CA+L+E 2% being the most methane-producing one (667,52 mL), followed by CA+L+O 0,1% (656,84 mL). All of the volatile fatty acids analyzed were identified in the bioassays, but the initial samples of the cellulase experiments presented less amount and variability of acids, whereas the final samples showed high incidence of acetic and propionic acids. In the pectinase experiments, acetic, propionic and butyric acids were constant through the initial and final samples, while isovaleric acid was detected in the initial samples. The biodigestion of poultry litter can be considered an ecofriendly destination for the residues from the poultry industry, and although the enzymes added didn't show influence in methane production, they contributed for the production of volatile fatty acids, which are also products of high economic interest.

Palavras-chave: Poultry litter, Enzymes, Volatile fatty acids

Apoio: UCS, CNPq