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"Gheorghe Asachi" Technical University of Iasi, Romania

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BIOCHEMICAL METHANE POTENTIAL (BMP) TEST OF RESIDUAL BIOMASS FROM AGRO-FOOD INDUSTRY

Mariangela Soldano, Nicola Labartino, Claudio Fabbri, Sergio Piccinini

CRPA-Research Centre on Animal Production, Reggio Emilia, Italy; CRPA Lab- Environment and Energy Section, Reggio Emilia, Italy

Abstract

Anaerobic digestion is a bio-energy chain that allows exploiting with high efficiency crop and animal residues, wet and dried biomass, producing a biofuel (biogas/biomethane), ideal for conversion into electricity and/or heat or used for transport. The CRPA Lab, Environment and Energy Section of Tecnopolo of Reggio Emilia, has a systems to determination of the Biochemical Methane Potential (BMP) of different biomass and the real efficiency/reliability of a biogas plant. This parameter expresses the amount of biogas/methane potential obtained from the degradation of biomass, and expressed normal cubic meters of biogas or methane per kg of volatile solids.

The paper reports the results obtained from the physico-chemical characterization and BMP tests of various residues and by-products generated by the agro-food industry. These biomass are of considerable interest to the high supply of organic matter and the absence of unwanted fractions; so they are suitable for sending in anaerobic digestion and a possible solution for their recovery. They can also represent an interesting alternative to energy crops whose use in anaerobic digestion is currently a issue of great discussion.

The BMP laboratory plant (in batch) consists of reactors that are glass bottle with a 1.500 ml working volume. They are maintained at 36°C ± 2°C by a thermical room. Substrate is mixed with an inoculum that is a digester sample in a biogas plant and a salt solution.

The measure of the amount of biogas produced is done by two methods: manometric and mass system. In the first case the measurement is done directly in the digester by measuring the increase in pressure in the headspace due to the generation of CO_2 and CH_4. In the second case, the measurement is performed when analyzing the biogas quality with a thermal dispersion mass sensor. The system allows evaluating the kinetics of reaction and substrate utilization rate by microorganisms. The article reports the BMP test of 5 biomass of interest from agro-food industry. It was analyzed the curve of cumulative methane production and the curve of the rate of volatile solids degradation of a BMP test of rapeseed cake (residues after extraction of the oil, comes from different).