

Biologic pre-treatment of lignocellulosic wastes to improve biogas production

Hrdinová Jitka, Jagošová Vanda, Kozumplíková Milena, Minařík Miroslav, Píštěk Vlastimil

EPS, s.r.o., V Pastouškách 205, 686 04 Kunovice, Czech Republic

eps@epssro.cz

The extension of the raw material basis for biogas station was the main object of this research. The biological pre-treatment of lignocellulosic wastes (straw, waste paper, sawdust, and poppy-heads residues) improvement in biogas production was investigated.

In the first stage, the lignocelluloses were hydrolyzed aerobically for 2-12 weeks, using three cellulolytic microorganisms: *Trichoderma reesei*, *Trichosporon cutaneum* and strain with operational name - Tur3. This stage was followed by anaerobic digestion at 55 °C for 40 days. The biogas volume and concentration of released methane were determined during the process.

The biological pre-treatment of poppy-heads residues with *Trichoderma reesei* increased the production of methane by 6.5 % after four weeks; pre-treatment of straw by 26.4 % after 12 week, pre-treatment of paper by 9.7 % after 12 weeks and sawdust by 14.7-40.8 % after 2-4 weeks. Four week pre-treatment of poppy-heads residues with *Trichosporon cutaneum* improved methane production by 25.0 %, pre-treatment of straw by 10.4-28.9 % after 2-4 weeks, pre-treatment of paper by 3.3-16.5 % after 8-12 weeks, pre-treatment of sawdust by 21.0 % after 12 weeks. Strain Tur3 did not prove significant increase in methane production (straw 2.5 % 12 weeks and sawdust 9.3 % 2 weeks). In other cases, the biological pre-treatment had negative influence on methane production.

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