



## Effects of biogas digestate on soil properties and plant growth

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Farming methods and food industries generate large amounts manure and other useful raw materials that need safe disposal. Following the international trends great numbers of biogas plants were opened during the last few years in Hungary. However this issue presents a number of new questions, including the subsequent use of anaerobic fermentation residues. So far we have only limited information about it's agricultural applications. Farmers and authorities are very skeptic because feedstocks are very different so the endproduct will be different, too. However, this endproduct can be applied as fertilizer. The aim of our work is to determine the effects of this product in plant-soil system. Digestate contains high amount of nitrogen which is present mainly ammonium form and this form can cause root depression and lower germination rates.

Pot experiments were established with different rates of nitrogen content (80 kg ha<sup>-1</sup>N, 120 kg ha<sup>-1</sup>N, 170 kg ha<sup>-1</sup>N, and control). Maximum rates were determine by the Nitrate Directive. Soil moisture was 60% of maximum of water capacity. Digestate and distilled water were homogenized and added to 200g loamy soil. Rye-grass (*Lolium perenne*) was applied as a test plant. Treatments were randomized design and 10 replications. Three pot from each treatment were used to observe the germination and progress of plants. We investigated the effect of the digestate on nitrate- and ammonium-ion content of soil. The amount of nitrate- and ammonium-N of soil was determine with distillation. The ammonium-N levels increased with the doses on the first day but on the sixth-seventh day this amount totally falled down, because NH<sub>4</sub>-N transformed to NO<sub>3</sub>-N. Nitrate level increased continuously untill the tenth day, later decreased as the result of the plant and microbes consumption. The increasing doses inhibited the germination and root development of the plants. We experienced fewer roots, which were different form control.