



New agrotechnical processes in the system of sustainable agriculture – Maize-legume mixed culture

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The production of biogas from energy crops represents the alternative source of electric and thermal energy. The most used raw material for biogas plants is maize silage. Unfortunately, the large fields of maize monoculture can lead to decrease in soil quality, represented by soil erosion, decrease in soil fertility, etc.

The present work deals with hypothesis that the cultivation of maize (*Zea mays*) in maize-legume mixed culture improves soil quality as well as biomass production per unit area, with almost equal or increased biogas specific production.

During field experiments, maize and legumes (p. e. broad bean, white lupin, white sweet clover, common vetch, indian pea, chick pea) were sown simultaneously. The legumes rows were sown between maize rows, that improves the utilization of resources including water, nutrients and solar energy and increase the protection of soil from damage by erosion. The maize-legume mixed cultures were harvested for the silage production. These silages were used as raw material in experimental small-scale anaerobic fermenters in order to find out the specific biogas and methane production of different maize-legume mixtures. In addition to biogas production, the application of digestate in combination with the biological fixation of nitrogen could play an important role in effort to reduce the use of mineral fertilizers.

To sum up, the use of legumes in sowing process (including mixed cultures) represents agrotechnical procedure leading to sustainable agriculture.

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