

## Summary

Slurry separation is a suitable method for the treatment of biogas fermentation residues.

Liquid and solid fractions differ not only in nutrient contents, but also in fertilizer characteristics and the solid phase saves storage capacity and is useable in water protection areas. To enable a fertilization due to the demand of the plants it's necessary to analyse nutrients regularly.

## Background

Cattle slurry has a high content of dry matter and mucous substances. Biogas fermentation residues with a high use of grass silage contain an high amount of fiber substances.

In both cases infiltration of slurry in the soil is difficult. Gaseous nitrogen losses are often very high. Also the use of soil near application techniques or even slurry injectors may cause problems by the use of high viscous slurry.

High ammonia losses means on the one hand a lack of nutrients. On the other hand greenhouse gas emissions increase.

The objective for a fast infiltration in the soil is to applicate slurry or biogas fermentation residues in a liquid condition. One possibility to achieve this is separation of slurry or biogas fermentation residues.



## Methods

The experiment investigated the impacts on dry matter yield and botanical composition of fertilization with different fractions (liquid and solid) after separation, mineral fertilizer and zero fertilizing. The used amount of fertilizer was equal the usual amount on the pilot farm.

The slurry separator can be installed on the farm and every day slurry or biogas fermentation residues can be continuously separated. Another advantage is the reduction of the storage capacity of the liquid slurry of 15 – 20%. But for the solid fraction also storage capacity with leak-proof ground has to guaranteed.

## Results

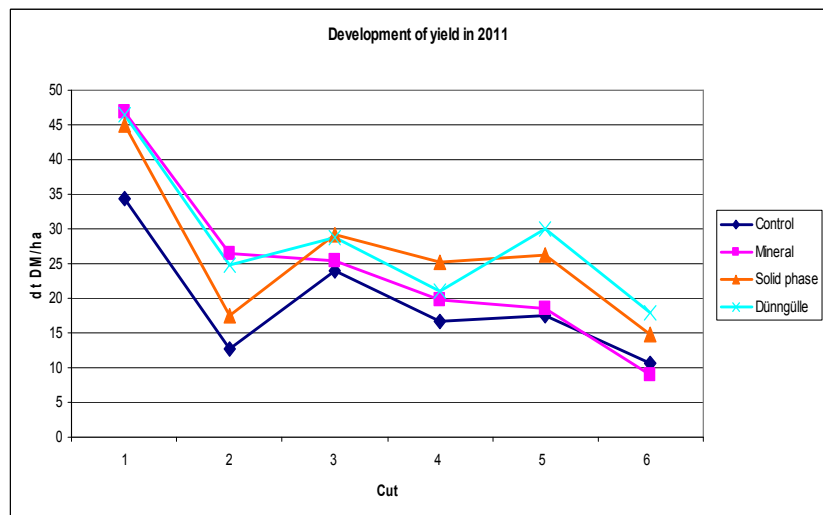
Slurry separation means additional invest- and operation costs. On the other hand costs for mixing the slurry storage tank are reduced. Storage tanks of cattle slurry or biogas fermentation residues without separation often contain a thick floating layer with fiber material.

It's also possible to separate the whole storage tank short time before the application with a mobile slurry separator.

The liquid fraction after separation contains more of the water soluble nutrients, this means more ammonium and potassium. However it contains less organic bound nutrients, for example phosphor. Thus the liquid fraction correspondence quiet good to the nutrient requirement of permanent grassland.

Biogas fermentation residues contain a high amount of nitrogen. Particularly if a lot of grass silage is used in the biogas process. Moreover the percentage of ammonium is higher, compared to cattle slurry.

The figure shows exemplarily one result from the experiment. The dry matter yield in 2011 of biogas fermentation residues (liquid and solid) was higher compared to mineral fertilizer. One reason may be the higher amount of nutrients in this variants, because oft he high concentrations of biogas fermentation residues.



## Recommendation

Slurry separation is an useable system to produce flowable fertilizer which correspond to the demand of permanent grassland and makes an efficient fertilizing possible.

Biogas fermentation residues contain a high concentration of nutrients. For efficient use as fertilizer regular analyses are necessary.

The solid fraction after separation can be used for fertilizing plants with higher requirement of phosphor, for example maize. It's also possible to use it in water protection areas.

To reduce gaseous ammonia losses while storage of the solid fraction it's necessary to use it short time after separation or to cover it with foil.