

Silage (fresh) for biogas

New ideas are necessary for the production of renewable energy sources.

Loppings of diverse origin are increasingly used for the production of biogas. Thereby is the construction of biogas plants and their optimisation in regards to science still a broad field of activity.

The task consisted of processing fresh silage, as well as corn and grass silage in the same manner. Goal of the work is the determination of the chemical oxygen demand the CSB value.

For this purpose various suppliers offer ready made testing solutions, for example CSB according to Dr. Lange or by Riedel-de Haen the vessel test 37737 „AQUANAL“. Hereby, the mass of oxygen per volume unit which reacts in standardised conditions with the in water suspensions contained oxidisable substances, is measured as a potassium dichromate equivalent in a sulphuric solution via photometry. The CSB value correlates with the results of the fermentation tests of organic substances performed according the guideline VDI 4630. This offers uniform rules and specifications for the practical applications of fermentations tests, which serve the operational optimisation of biogas plants. For further information about the production of biogas please refer to energytech.at/biogas/portrait.html . Those more interested in the basics, should search in the internet for *Martin Kaltschmitt* an author in regards to *Energy made of biomass*.

FRITSCH was given the task, to process fresh grass silage with a higher degree of moisture, in a manner, so that a homogenous sample would evolve. Chosen was the planetary mill PULVERISETTE 6 classic line in combination with a 250ml cup made of sintered corundum and balls of 30 mm diameter. From tests with other tough, elastic materials it is known that the slightly rough surface of sintered corundum has a very positive influence on the comminution.



During the tests a buffer solution was added to the silage. Therewith the solids content was lowered. After four minutes the material was extremely well ground. Temperature readings were also in a normal range and therefore thermal damage was not to be expected. The established CSB values were clearly different though form the CSB values of the samples prepared with previous methods. It became therefore clear, that the processing of the samples has a significant influence on the test value of the chemical oxygen needs. Since it depends more on the comparability with the existing data

rather than the absolute values, the preparation was matched to the previous mode. For this the silage was pre-crushed in a household mixer and then finely comminuted in a planetary ball PULVERISETTE 6, equipped with a 250 ml steel cup and 20 mm balls.

With this preparation, comparable results in regards to the empirical values and the correlation with the batch tests of the produced methane yields are achieved.



Dry as well as fresh materials can be pre-crushed in a mixer.



The fine comminution is carried out with the planetary ball mill PULVERISETTE 6. The photos illustrate the condition before and after the treatment with the ball mill.



This procedure is more elaborate and evaluating it visually a not so homogenous final product evolves. But all decisive though is the comparability of the CSB values with other values and the correlation of the in laboratory tests produced amounts of methane.

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