

Appendix 4

From: weiland [peter.weiland@fal.de]
Sent: 30 April 2004 15:17
To: Greenfinch Ltd
Subject: Re: Greenfinch Ltd: Ryegrass Project

Dear Ms. Holliday,

its a great problem that very often the gas yield from energy crops differ considerably. Reason is very often the time of harvesting, the kind of crop, the particle size, the rainfall conditions, the soil quality and least but not last the experimental unit.

Our experiments were carried out with short cutted grass of only few mm which were ensiled before anaerobic digestion. The experiments were carried out in batch fermenters of about 25 l at 37 oC. Therefore the dates presents the maximum methane yield which cannot be obtained in continuously operated reactors, especially if scum formation occurred.

Many of our experiments have shown, that ensiling increase the gas yield, but the results strong depends on the acid spectrum which is formed during ensiling. For different types of grass silage we and also other colleagues (Oechsner, Linke) have measured also methane yields between 220 and 380 l per kg ODM. But we also know results from colleagues who found only 90 l per kg ODM of fresh grass.

Due to the strong scattering of gas yield dates a KTBL working group was built few month ago in order to collect dates for a data base. Obviously, a more detailed analysis of the components is necessary in order to determine the feed-value of the substrate. ODM is not a very good parameter for comparing the gas yield of energy crops.

Best regards
Peter Weiland

----- Original Message -----

From: [Greenfinch Ltd](#)
To: peter.weiland@fal.de
Sent: Tuesday, April 27, 2004 5:48 PM
Subject: Greenfinch Ltd: Ryegrass Project

Dear Professor Weiland,

My name is Lucy Holliday, I am the research scientist for Greenfinch Ltd. You met the company Director, Michael Chesshire at the European Biogas Workshop in 2003. We are currently running a project funded partly by the UK government entitled 'Ryegrass as an Energy Crop Using Biogas Technology'. We are investigating the production of ryegrass as an energy crop, looking specifically at four different cutting regimes, of 2, 4, 6, and 8 week cycles with respect to differing yields and the effects these cycles may have on methane yield when digested in our 300 litre biogas plant. The project has been running for nearly 12 months, and is due to continue for another 12 months.

We are using your paper 'Evaluation of the Newest Biogas Plants in Germany with Respect to Renewable Energy Production, Greenhouse Gas Reduction and Nutrient Management' as a guide for some of our targets; with particular reference to ryegrass figures of $410\text{m}^3\text{CH}_4.\text{tODM}$, and $4060\text{m}^3\text{CH}_4.\text{ha}^{-1}.\text{yr}^{-1}$. So far, we are struggling to reach your figures. We have reached $330\text{m}^3\text{CH}_4.\text{tODM}$ several times, however to date we have an overall average of $250\text{m}^3\text{CH}_4.\text{tODM}$.

The micro biogas plant is fed daily with 1kg of dry matter. At present we are feeding it with fresh grass, however we are ensiling the cut grass into black plastic bags. The temperature of the digester is kept at an average of 36 Degrees Celsius. The contents of the digester is mixed every 20 minutes for 5 minutes.

I am very interested to know more about your experiment with respect to both the cutting and storage of the grass and the set up of your biogas plant. I would be very grateful if you could give me any information and would be happy to discuss our project in more detail with you.

I look forward to hearing from you,

Your sincerely
Lucy Holliday
Greenfinch Ltd