

Practical Experience with Rye Whole Plant Silage as a Source of Biogas – A Farmer Reports



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Gut Karow

RYE BELT Congress Poznan

Classification

- Introduction to the Gut Karow concern
- Motivation for rye – WPS – cultivation
- Cultivation and management of assets
- Harvest
- Conclusions
- Specification literature



Introduction to the Gut Karow concern

- **Salient features of the location**
 - 64m above sea level
 - Annual mean temperature: 8,7 °C
 - Precipitation: Ø 658 l/m²/a
 - Ø 30 soil composition with sandy loams, loamy sands
 - Total area of holding fully rounded
- **Factor endowment**
 - Land area suitable for agriculture: 1000 ha arable, 400 ha grassland
 - Woodland: 1200 ha forest
 - Cultivation structures:
 - Winter rape – winter wheat – rye – WPS
 - Maize – Rye – Rye
 - Maize – Maize – Maize



Introduction to the Gut Karow concern

- Cattle husbandry
 - 250 pedigree Angus cattle →
"The largest Angus breeding station in Germany"
- Production
 - All harvested threshable cereals, apart from rape, are stored in the low level granary (2500 t)
 - Workforce: 1 Operation Manager, 11 skilled workers, 2 trainees
 - Provider of biogas plant with 625 kWh output
 - 7500 t Maize silage
 - 3500 t Whole rye plant silage
 - 1500 t Cow dung



Motivation for rye – WPS – cultivation

- **Soil fertility !!!**
 - Maize - 560 humus equivalent/ha/a.
 - Humus = buffer relating to water supply for plants considering the imminent 2 °C climatic warming
 - 1 kg humus stores 4 kg water
- Resulting yield composition (cross compliance)
- Better capacity utilisation of in-house drill equipment
- Possibility of “dual utilisation” (WPS or grain)



Cultivation and management of crops

- Sowing
 - From 5th. September
 - 130 – 150 grains/m²
 - Hybrid rye (e.g. Palazzo, Brasetto)
 - Unploughed

- Manuring
 - Spring:
 - 110 kg N/ha
 - 100 kg kieserite/ha
 - 100 kg potash/ha
 - 3 kg magnesium sulphate/ha
 - 0,5 l Yara Vita grain

Σ 136 €/ha manure costs



Cultivation and management of crops

- Pest control

- Autumn:

- Herbicide 0,3 l/ha Herold

- Spring:

- Growth regulator

- 1,3 l/ha CCC

- 0,2 l/ha Moddus

- Herbicide

- 0,6 l/ha Ariane C

- Fungicide

- 0,3 l/ha Alto 240

- + green manure s. o.



ES 31

Σ 62 €/ha pest control costs



Harvest

- Harvest time
 - Milk ripe
 - TS – composition in the entire plant of 30 – 36 %
 - Harvest target: 300 dt FM/ha.
- Harvesting equipment
 - Chaffing of the existing crop
 - Chaff length: 5 – 7mm
- Ensilage
 - Trauenstein silos
 - (22 x 60m) direct to BGA
 - **Compaction in silo!**



[Own Photo]



Harvest

- Trial results

187 m³ biogas/t FM with
a methane content of
55 % at 34,8 % TS

Registrier-Nr.: DAP-PL- 3783.00

Auftraggeber	Firma
Gut Karow Zarchliner Str. 1 19395 Karow	

Prüfbericht

Auftrag : 08.07.2009	Probenahme : 07.07.09
Aktennummer : 658-09-2	Probeneingang : 08.07.09
Journalnummer : S 4863	Prüfzeitraum : 08.07. – 10.07.09
Probenart : Ganzpflanzensilage - Roggen	Kundennummer :
Proben-Nr. : 9 / Silo 1 BGA mitte	Seitenzahl : 1

Sensorische Prüfung

Gefüge : Blätter und Stengel erhalten	Schnittzeitpunkt : in der Milchreife
Geruch : aromatisch	Verschmutzung : keine
Farbe : grün-gelblich	Schimmelpilzbefall : ohne

Chemisch-analytische Prüfung

Untersuchungsparameter	Frischmasse	Trockenmasse	Methode
Trockensubstanz (g/kg)	348	1000	VDLJFA III 3.1
Rohasche (g/kg)	13	38	VDLJFA III 8.1
Rohprotein (g/kg)	33	96	VDLJFA III 4.1.1
Rohfaser (g/kg)	100	287	VDLJFA III 6.1.4
Rohfett (g/kg)	9,7	28	VDLJFA III 5.1.1
Stärke (g/kg)	12,9	37,1	VDLJFA III 7.2.1
pH-Wert	4,2		

Auswertung

NFE	551 g/kg TS
oTS	96,2 % TS
Biogasausbeute	559 l/kg oTS
Methanausbeute	307 l/kg oTS
je 1 t Frischmasse	187 m ³ Biogas m. einem Methangehalt von 55 %

Beurteilung Ergebnisse

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[Own Data]



End result

Even if maize shows a yield advantage over rye – WPS, the WPS crop is a rational alternative regarding increased biomass production, above all in humus rich fruit yield.



Specification Literature

- **ARBEITSGEMEINSCHAFT LANDTECHNICK UND LANDWIRTSCHAFTLICHES BAUWESEN IN BAYERN**
Winter cereals for whole plant silage for biogas production, 2010
- **THOME, U:** Maize is no solution, 2010



Thank you for your attention!



[Own Photo]

