ULTRAWAVES BIOSONATOR FOR IMPROVEMENT OF BIOGAS PRODUCTION ON FARMLAND BIOGAS PLANTS

Loburg FBP, Germany



I. Specification of the plant

Plant capacity	• 560 kW • 2 main digesters à 1,270 m^3 • 1 storage tank à 2.280 m^3 • Hydraulic retention time 40 days/digester

II. Objective of the Biosonator test

- Intensification of the anaerobic digestion process
- Reduction of the substrate input
- Increase in specific biogas yield

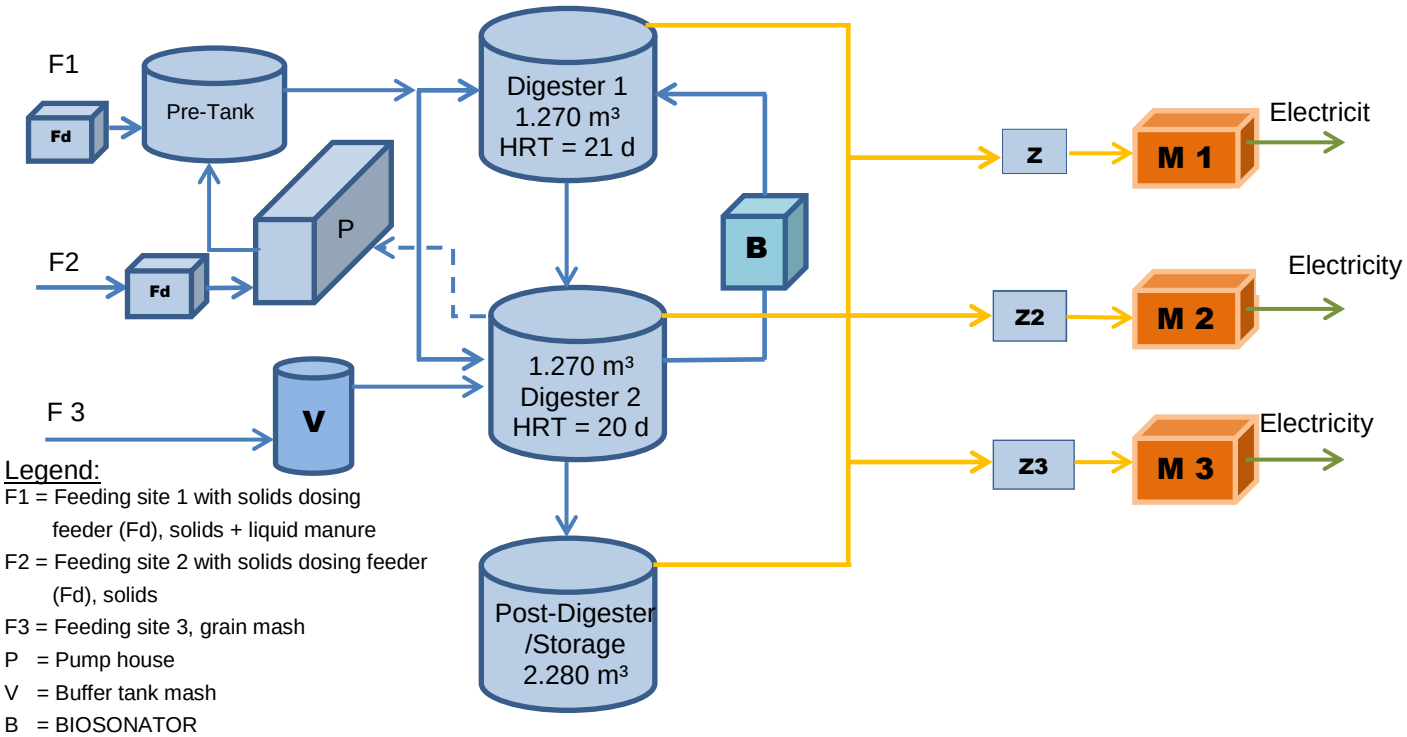
III. Installation of the Biosonator

- In October 2012, one Biosonator (with 5 kW ultrasound power) was installed
- Test phase: 8 months (November 2012 till July 2013)
- Sonication of a partial flow (28,8 m^3/d) recirculated from digester 2 into digester 1 in automatized 24-hour mode (figure 1)

V. Results oft he Biosonator treatment

- Durable impact of the BIOSONATOR on the reactor system provable after 1,5 retention times
- Evidence of the substrate and the substrate cost reduction at constant power production: substrate savings 7.4 % and cost reduction about 17 % = 51,800 EUR per year (see table 1)
- Stabilization and increase of the biogas production of 6 % and due to that an additional income of about 9,800 EUR per year because of an additional conversion into electricity and better exploitation of the net connection capacity.

- Reduction of the viscosity of the biomass suspension, thus decreasing energy consumption for mixing and pumping
- Reduction of the input of expensive substrates (like corn) (figure 2)



Legend:
F1 = Feeding site 1 with solids dosing feeder (Fd), solids + liquid manure
F2 = Feeding site 2 with solids dosing feeder (Fd), solids
F3 = Feeding site 3, grain mash
P = Pump house
V = Buffer tank mash
B = BIOSONATOR
Z = Biogas meter (1 – 3)
M = CHP engine (1 – 3)

Figure 1: Construction of Loburg FBP and integration of the Biosonator.

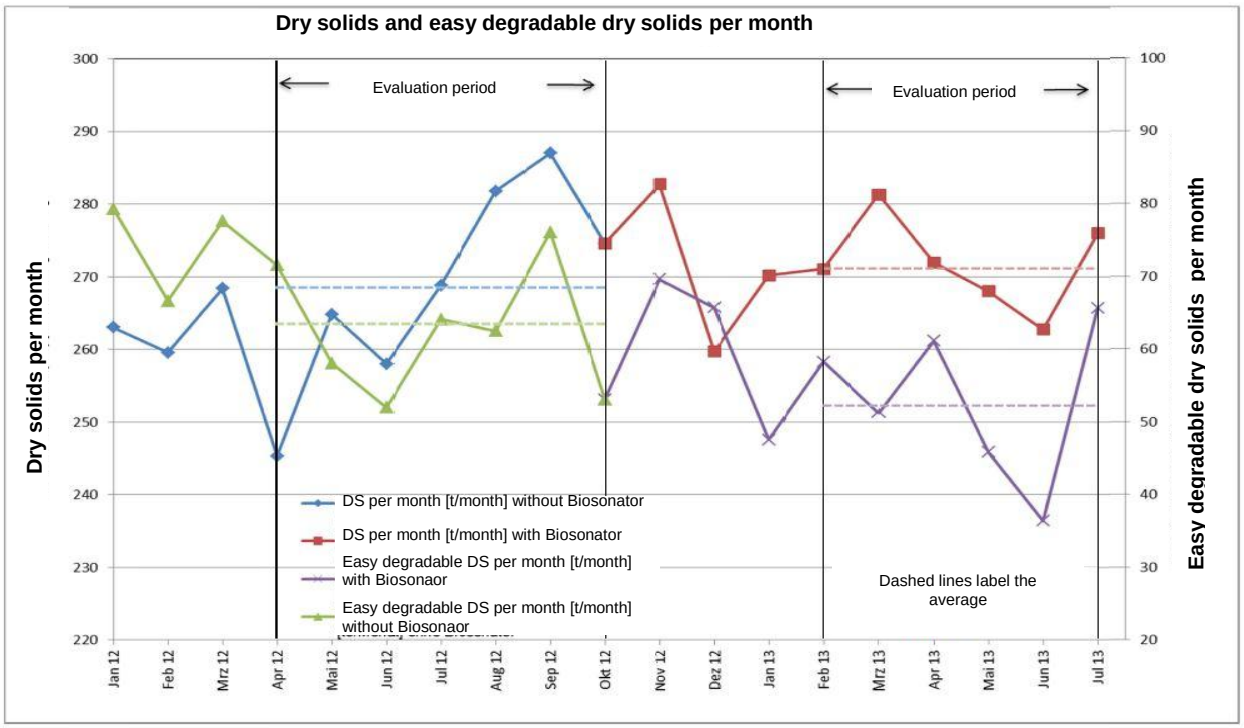


Figure 2: Dry solids per month in the evaluation months with and without the BIOSONATOR

	01.04.2012 till 31.09.2012 without BIOSONATOR	01.02.2013 till 30.07.2013 with BIOSONATOR	Difference related on **6** comparable month
Maize silage	2.266 t	2.288 t	+22 t
Maize silage waste	406 t	402 t	- 4 t
Millet silage	891 t	750 t	-141 t
Rye grain, grinded	275 t	155 t	-120 t
Corn mash (wheat)	2.414 t	3.072 t	+658 t
Cattle liquid manure, dairy cattle	2.778 t	3.184 t	+406 t
Fresh bulk, sum	9.030 t	9.850 t	+820 t
Dry solids, sum	1.606 t	1.631 t	+ 25 t
Thereof fast degradable dry solids (rye grain + wheat mash)	**385 t**	**319 t**	**- 66 t**
Total costs substrate	152.719 EUR	126.797 EUR	- 25.922 EUR
Total costs substrate per year	305.438 EUR	253.594 EUR	- 51.844 EUR

Table 1: Fresh biomass input, dry solids mass and substrate costs without and with installation of the BIOSONATOR.

Contact:

Ultrawaves GmbH
Wasser & Umwelttechnologien
Kasernenstraße 12
21073 Hamburg
E-Mail: info@ultrawaves.de
Phone: +49 (0)40 325 07 203
Fax: +49 (0)40 32507 204
www.ultrawaves.de

Operator contact via Bert Energy India