



Digestate treatment in Sweden and Germany

Applied technologies and technologies under research

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About IBBA

IBBA is the **mail based information exchange** service for **increased cooperation** of Swedish and German biogas protagonists, **open for everybody without membership, administration, fees!**



The Inter Baltic Biogas Arena **offers:**

- Non-commercial information and exchange of biogas knowledge
- Project information in research and industrial scale
- Support for bilateral cooperation


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97 registrations (47 research, 50 industry), newsletter, digestate Workshop



	Produced digestate (tons wet weight)	Percentage used as fertilizer (%)	Biogas-production (GWh per year)
WWTP	610,000	24	638
Co-digestion	717,910	94	416
Agricultural	106,430	100	20

	Produced digestate (tons wet weight)	Percentage used as fertilizer (%)	Biogas-production (GWh per year)
WWTP*	9,000,000	30	2,500
Co-digestion	7,000,000	close to 100	5,000
Agricultural	66,000,000	100	51,000,000

*numbers from 2010; additionally about 15 % of digestates are used in landscape construction (e.g. landfill covers)

Framework for digestate utilisation I

- Limits on the amount of heavy metals (and organic pollutants)
- Differentiation for digestate from WWTP and other biogas plants
- Additionally: rules on soil quality do apply (allowed amount of single heavy metals per hectare agricultural land) - but in Germany depending on soil types



Contaminant	WWTP sludge mg / kg DM sludge	WWTP sludge mg / kg DM sludge	Other digestates mg / kg DM sludge	Other digestates mg / kg DM sludge
As	40		40	
Pb	900	100	150	100
Cd	10	2	1,5	1
Cu	700	600		600
Cr	900	100		100
Cr ^{VI}	2		2	
Hg	8	2,5	1	1
Ni	200	50	80	50
Tl	1		1	
Zn	2,500	800		800
PFT	0,1		0,1	
PCB	0,2			
PCDD	100 (ng TEQ/kg DM)			
I-TE Dioxine and dl-PCB	30 ng WHO-TEQ / kg DM*			
AOX	500			

*only applicable when biowaste is contained

Sources: Klärschlammverordnung/Düngemittelverordnung SFS 1998:944

Düngemittelverordnung

SPCR120



Research and development I

Institution	Activities
SLU (University of Agricultural Sciences)	biofertilisers in sustainable cropping systems
JTI (Swedish Institute of Agricultural and Environmental Engineering)	value of digestate from an agricultural perspective; equipment for handling the digestate; the impact on the environment by the handling methods
Swedish rural economy and agricultural societies	value of digestate from an agricultural perspective; long term field trials
Linköping University	systems and technology for effective use of biofertilisers; assessment model to analyse critical factors affecting economic and environmental performance of management approaches
Lund University	nitrogen and phosphorus recovery through induced struvite formation; use of cryogels for removal of heavy metals for improved biodigestate quality

This list gives an insight into main activities but will never be complete



Institution	Activities
Kompetenzzentrum Biomassenutzung Schleswig-Holstein	working very holistic on the production and use of digestates as fertilizer in the whole biogas / energy crops production chain
Münster University of Applied Sciences	technology for ammonia stripping combined with drying of digestates from manure digestion
Anhalt University of Applied Sciences	nitrogen reduction of digestates as pretreatment before further use as fuel for gasification of digestates
Thüringer Landesanstalt für Landwirtschaft	largest research project on energy crops production and use in biogas plants where use of digestates as fertiliser do play an important role (EVA)
GNS	Anastrip technology, a stripping method of ammonia from the biogas process
DBFZ Deutsches Biomasse-forschungszentrum	analysis on thermochemical gasification of digestates; theoretical evaluations of digestate treatment technologies; measurement and evaluation of greenhouse gases from digestates utilization

This list gives an insight into main activities but will never be complete



Institution	Activities
University Rostock	optimization of the use of phosphorus from digestates
Fraunhofer institute IGB	phosphor recycling (struvit-precipitation) actually in the lab level
Department of Agrobiotechnology at IFA Tulln (Austria)	comparison and evaluation of available technologies; research on nitrogen extraction

This list gives an insight into main activities but will never be complete

- From practice and research a very deep interest in improved and cost efficient methods for digestates utilisation is visible
- Main questions and problems are the same in D and S and solutions are under research and pilot phase on both sides
- Technologies will be able to increase the value of digestates or fractions
- Highest and most sustainable use seems to be still utilisation for fertilisation
- Technologies used are partially depending on the subsidy system

The importance of efficient digestates utilisation will raise with increasing prices of conventional fertilisers.

Knowledge exchange will have a large effect on the efficiency of research and practice.

Join our Digestate Workshop in Sweden!

DIGESTATE USE & TREATMENT



Swedish-German Workshop
5th September, Malmö/Höör, Sweden

One Day Nutrients, technological solutions & cooperation

Exchange with leading experts from research and practice

Market overview and technology suppliers

Nutrients separation and recirculation

Programme and registration: www.ibbaworkshop.se

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