



Matthias Kühle-Weidemeier (Herausgeber)

Katrin Büscher (Herausgeber)

Waste-to-Resources 2017

*VII International Symposium MBT and MRF. Resources and Energy
from Municipal Waste*

Matthias Kuehle-Weidemeier, Katrin Buescher

Waste-to-Resources 2017

**VII International Symposium
MBT and MRF**

Resources and Energy from Municipal Waste

Proceedings

16th – 18th of May 2017

Organisers

wasteconsult
INTERNATIONAL
www.wasteconsult.de



Gold Sponsor



Silver Sponsor



Cuvillier Verlag Göttingen
Internationaler wissenschaftlicher Fachverlag

<https://cuvillier.de/de/shop/publications/7531>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany
Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>



Content

I Resource and climate protection by circular economy

- Climate protection through circular economy** 1
Y. Busch, Verein Klimaschutz durch Kreislaufwirtschaft e.V., Iserlohn, Germany
- Decarbonization and energy generation can go hand in hand: The future is climate-positive!** 10
M. Schmid; R. Fröhlich; R. Stucki, Ökozentrum, Langenbruck; Compag AG, Kreuzlingen; MPT GmbH, Würenlingen, Switzerland

II Energy recovery

- Status of co-incineration in Germany. S. Flamme, Fachhochschule Münster** 21
S. Flamme, S. Hams Gütegemeinschaft Sekundärbrennstoffe und Recyclingholz e. V. (BGS), Münster, Germany
- Framework conditions for co-combustion of RDF in the power plant industry** 30
F. Mielke, S. Kappa, Supply and Disposal Management, Lausitz Energie Kraftwerke AG, Cottbus, Germany
- Co-incineration in cement plants** 39
M. Oerter, Forschungsinstitut der Zementindustrie GmbH, Düsseldorf, Germany
- Solid recovered fuels: determination of the renewable content** 47
I. Zdanevitch, G. Remond, G. Thonier, E. Poncelet, INERIS, Verneuil-en-Halatte, INDDIGO, Paris, Deloitte Développement Durable, Neuilly-sur-Seine, ADEME, Angers Cedex, France

III Recycling processes for plastic and mixed waste fractions

1

- Recycling of plastics - possibilities and limits.** 60
M. Scriba, mtm plastics, Niedergebra, Germany
- Material recovery by conversion to oil** 68
N. Karpensky, C. Haupts, Recenso, Remscheid, Germany

IV Landfill capacities

- Landfill capacities in Germany** 77
H. Häming, InwesD, Cologne, Germany



V Waste management and circular economy worldwide

- North America's First Circular Economy Framework - Challenges and Opportunities** 90
J. Cocker, Toronto, Ontario, Canada
- Circular Economy in the U.S.: Business Opportunities for European Vendors of Recycling and Waste Conversion Technology** 104
I. Freesen, Freesen & Partner GmbH, Uedem, Germany
- MSW management in Estonia: The current situation and future potential for energy recovery from sustainable sources.** 110
A. Clausen, C. Garcia Lopez, M. Kriipsalu, T. Pretz, RWTH Aachen University, Germany, Estonian University of Life Science, Estonia

VI Waste management in emerging countries

- Adapted selective waste collection concepts for developing and emerging countries** 120
W. Pfaff-Simoneit, KfW Development Bank, Frankfurt, Germany
- Municipal solid waste management in India - Challenges and potentials** 134
C. Speier, M. Zacharias, D. Weichgrebe, Leibniz University of Hannover, Earth One GmbH, Langenhagen, Germany
- Integrated solid waste management in Electronic City** 148
V. Vidyaranya, M. Zacharias, Earth One GmbH, Langenhagen, Germany
- Mechanical biological waste treatment plant for Bangalore west zone** 161
M. Kuehle-Weidemeier, Wasteconsult international, Langenhagen, K. Ketelsen, K. Kanning, iba GmbH, Hannover, Germany
- Impressions from research project on the climate protection potential of integrated waste management for Indian cities** 172
A. Schwetje, R. Vogt, A. Stubbusch, Umweltbundesamt, Dessau, ifeu – Institut für Energie- und Umweltforschung GmbH, Heidelberg, Germany
- Current status and perspectives of material specific treatment of biogenic waste in China.** 179
M. Nelles, A. Lemke, G. Morscheck, A. Nassour, A. Schüch, Y. Zhou, Universität Rostock, Germany
- Brazilian waste management and its symbiosis to the cement market** 196
C. Pereira, K. Fricke, O. Kasper, L. Carlos R, H. Baier, TU Braunschweig, Terra Melhor Ltda ME, São José dos Campos, Brazil



Composting facility for Daressalaam	204
<i>F. Kölsch, S. Lübben, Dr. Kölsch Geo- und Umwelttechnik GmbH, Braunschweig, Stadtreinigung Hamburg, Germany</i>	

VII Utilization of organic waste and waste fractions 1

Autothermal fast pyrolysis of woody residues and wastes for the production of wood adhesives	215
<i>D. Li, F. Berruti, C. Briens, Western University, London, Ontario, Canada</i>	

A study of the process of obtaining alcoholic fraction from the waste of food, agricultural and woodworking industry	227
<i>M. Musaev, A. Abdurakhmanov, Tashkent state technical University, Uzbekistan</i>	

VIII Recycling processes for plastics, polymers and mixed fractions 2

Bio-based plastics in the post-consumer-recycling stream	233
<i>J. Bauer, KNOTEN WEIMAR International Transfer Centre Environmental Technology GmbH, Bauhaus-Universität Weimar, Germany</i>	

Mechanical Recycling of Polylactide Waste	243
<i>D. Bellušová, S. Mauer, H.-J. Endres, university of applied science Hanover, Germany</i>	

Flexible process technology for the mechanical processing of complex material flows.	254
<i>K. Bokelmann, T. Hartfeil, J. Knierim, C. Gellermann, R. Stauber, Fraunhofer-Institut für Silicatforschung ISC, Alzenau, Germany</i>	

IX Legal framework of the circular economy

BAT reference document for waste treatment completion of the process and impact on MBT	265
<i>W. Butz, Umweltbundesamt, Dessau, J. Ebbing, Institut für Entsorgung und Umwelttechnik (IFEU), Iserlohn, Germany</i>	

European Court of Justice and public procurement law – Recent rulings	286
<i>N. Hildebrandt, WMRC Rechtsanwälte, Berlin, Germany</i>	

Legal framework of the EEG 2017 for anaerobic digestion plant based on waste and residues	293
<i>F. Strippel, Fachverband Biogas e.V., Freising, Germany</i>	

Consequences of the German TA Luft 2017 and fertilizer ordinance on biological waste treatment plants 301
C. Cuhls, university of applied science Magdeburg-Stendal, Magdeburg, Germany

The new European Waste Catalogue and the POPs 310
B. Kummer, Kummer : Umweltkommunikation GmbH, Rheinbreitbach, Germany

X General and operational aspects of the circular economy

Presentation of a method for forecasting waste quantities 318
B. Zwisele, C. Böhm, ARGUS GmbH, Berlin

The commercial waste market in Germany until 2025 331
J. Gatena, trend:research GmbH, Bremen, Germany

Human resources development in waste management. 339
K. Gellenbeck, INFA GmbH, Ahlen, Germany

Fast-Track Notifications – simplifying waste shipments of in-out material for recycling. 346
C. Slijkhuis, Müller-Guttenbrunn Gruppe, Amstetten, Austria

XI Approaches to the expansion of material recycling

Ways for increased material recycling of material flows from MBT 352
M. Kuehle-Weidemeier, Wasteconsult international, Langenhagen, Germany

Resource management through the utilization of municipal waste fractions 368
T. Gruben, J. Martínez Gómez, university of applied science Trier, Germany

Storage facility private households: Utilizing unexploited potential 378
R. Brüning, J. Wolf, Dr. Brüning Engineering UG, Brake, Germany

XII Waste analytics

Challenges for an accurate characterization of waste 389
O. Kasper, C. Pereira, Terra Melhor Ltda ME, São José dos Campos, Brazil, TU Braunschweig, Germany

Characterization of municipal solid waste by particle size and pilot sorting tests 401
Y. Bernard, M.-A. St-Pierre, M. Daigle, Centre de recherche industrielle du Québec (CRIQ), Canada



Current research projects and status of the development of fast in process analytics 411
H. Itzel, Dr. HH. Itzel Management & Consulting GmbH, Munich, Germany

In seconds on-line measurement techniques for liquids, pastes, gases and vapors 419
C. Buck, Dr. Buck Prozess- und Onlineanalytik, Darmstadt, Germany

XIII MBT technology

Development of an optimization model for the design of MBT processes under final product constraints 425
C. Girard, L. Spreutels, R. Legros, Polytechnique Montreal, Canada

Evaluation of moisture removal in bio-drying process with auto-controlled aeration system 440
J.-R. Park, D.-H. Lee, S.-B. Choi, R. Guo, G.-Y. Ham, S.-J. Bae, University of Seoul, South Korea

Project Report of the MBT Jiangsu – Hightech Waste Processing for China 451
A. Moeller, Redwave, Wetzlar, Germany

XIV MBT technique presented by suppliers

Flexible and compact system for the efficient treatment of organic waste for biogas production 458
R. Zobel, Hugo Vogelsang Maschinenbau GmbH, Essen Old., Germany

Implementation of anaerobic treatment into Mechanical Biological Treatment Plants (MBT) 467
A. Huber, STRABAG Umwelttechnik GmbH, Dresden, Germany

T_{low} process AD for chicken manure 476
A. Himmelstoss, AEV Energy, Dresden, Germany

Think twice before shredding! Bagsplitter for MSW 491
L. Funes, R. Hungermann, Matthiessen Lagertechnik, Krempe, Germany

Innovative conveying and steep incline conveying technology in modular design 500
A. Veltmann, VHV Anlagenbau GmbH, Hörstel, Germany

Drastic reduction of waste streams in glass recycling by the use of highly efficient recovery stages 504
E. Lüth, Mogensen GmbH & Co. KG, Wedel, Germany

Waste sorting plant Medina 517
T. Dippert, FHF Anlagentechnik, Bad Oeynhausen, Germany

Drying Systems in Recycling Processes	521
<i>M. Trojosky, ALLGAIER Process Technology GmbH, Utingen, Germany</i>	
The Malta North Waste Treatment Plant (MNWTP) - Co-digestion of municipal solid waste, manure and chicken dung.	530
<i>S. Schulte, O. Haub, O. Muck, BTA International GmbH, Pfaffenhofen, Germany, T. Faria, Efacec Engenharia e Sistemas, S.A., Porto Salvo, Portugal</i>	
Kompogas® Dry Anaerobic Digestion and BioMethan Gas Upgrading Technologies in modern MBTs to Produce Carbon-Neutral Vehicle Gas	540
<i>L. Heer, Hitachi Zosen Inova AG, Zurich, Switzerland</i>	
Production of clean compost out of mixed MSW: A giant leap towards zero waste	554
<i>L. De Baere, W. Six, B. Mattheeuws, OWS nv, Gent, Belgium</i>	
 <u>XV Emission control</u>	
Effective odor control with the CSO Terminodour™ system.	568
<i>J. Stockinger, CSO Technik Ltd., Edenbridge, UK</i>	
Combined separation of fine dust and pollutant gases during the energetic utilization of biogenic residues	578
<i>R. Bindig, C. Thiel, I. Hartmann, DBFZ Deutsches Biomasseforschungszentrum, Leipzig, F. Prill, H.-J. Schmid, S. Schiller, University of Paderborn, Germany</i>	
Emission reduction in the energetic utilization of agricultural residues - combined reduction of PM and NOx.	592
<i>M. König, I. Hartmann, M. Matthes, DBFZ, Leipzig, Germany</i>	
 <u>XVI Utilization of organic waste and waste fractions 2</u>	
Management of contraries in biogenic waste	606
<i>M. Wellacher, Montanuniversität Leoben, Österreich, A. Kunter, Komptech GmbH, Frohnleiten, Austria</i>	
Separation of contraries during the treatment of biowaste prior to wet fermentation.	622
<i>W. Müller, Universität Innsbruck, Austria</i>	
Waste stream treatment for obtaining safe reclaimed water and biomethane for transport sector to mitigate ghg emissions	635
<i>G. Sánchez Santos, Barcelona, Spain</i>	



XVII Utilization of organic waste and waste fractions 3

- Production of activated carbons from biomass waste for environmental applications.** 640
A. Colomba, F. Berruti, C. Briens, Western University, London, Ontario, Canada
- Optimization of Preparation of new activated carbons from olive waste via sequential hydrothermal carbonization and activation with KOH and steam** 653
G. Enaime, A. Bacaoui, A. Yaacoubi, M. Wichern, M. Lubken, Cadi Ayyad University, Marrakech, Morocco, Ruhr-University Bochum, Germany
- High-quality biogenic silica from agricultural residues** 657
T. Schliermann, I. Hartmann, D. Enke, D. Schneider, S. Wassersleben, T. Jobst, A. Lange, F. Roelofs, DBFZ, University of Leipzig, Umwelt- und Gebäudetechnik 2000 GmbH, Chemiewerk Bad Köstritz GmbH, Germany
- Influence of different carbon sources including liquid additives from fermentation or composting on the purification of landfill leachate** 669
C. Steiner, S. Schröder, M. Balsam, C. Wolf, P. Beese-Vasbender, M. Denecke, A. Rehorek, TH Cologne, Forschungsgemeinschaft :metabolon, Lindlar, Germany

XVIII Utilization of mineral waste

- Creation of a resource cadastre in the residential building sector** 680
Ö. Özdemir, K. Krause, A. Hafner, Ruhr-University Bochum, Germany
- Recovery of critical resources from production waste of the specialised glass industry by gas-phase reaction** 697
G. Homm, K. Kazmierczak, C. Gellermann, R. Stauber, Fraunhofer-Institut für Silicatforschung (ISC), Alzenau, Germany
- Reuse of building components** 710
A. Lieberum, Bundesverband bauteilnetz Deutschland e.V., Bremen, Germany

XIX Posters

- Supercritical water gasification in pilot-scale unit ZAHYKORMA** 721
M. Svab, E. Purkarova, Dekonta, a.s., Dretovice, University of Chemistry and Technology, Prague, Czech Republic
- Monitoring of biofilters in the context of Czech legislation** 727
K. Vondrakova, M. Sir, J. Sedlacek, University of Chemistry and Technology Prague, Puralab s.r.o., Prague, Czech Republic
- Home composting of vegetable and fruit scraps** 733
H. Guven, Istanbul Technical University, Istanbul, Turkey