12th RAMIRAN International Conference

"TECHNOLOGY FOR RECYCLING OF MANURE AND ORGANIC RESIDUES IN A WHOLE-FARM PERSPECTIVE"

11-13 September, 2006

Conference venue: The historic open-air museum "The Old Town", Aarhus, Denmark
About RAMIRAN

The Network on Recycling of Agricultural, Municipal and Industrial Residues in Agriculture (RAMIRAN) is part of ESCORENA - the European System of Cooperative Research Networks in Agriculture. ESCORENA was established by the FAO Regional Office for Europe (REU) in 1974. It is a form of voluntary research cooperation among interested national institutions involved in research in food or agriculture in European countries. Over the years, ESCORENA has expanded its field of activities to include topics and themes of interest to other countries, particularly those from the Near East and Mediterranean area.

Network coordinator: José Martinez, CEMAGREF, France.
Email: Jose.Martinez@cemagref.fr

Much of the detailed work of the network is undertaken by the Working Groups. There are currently 7 Working Groups within RAMIRAN including 2 new groups that were established at the last Workshop in Gargnano.

The titles, chairmen and contact details for these groups are listed below.

**Hygienic aspects**
Reinhard Böhm
Universitat Hohenheim, Germany
Email: boehm@Uni-Hohenheim.de

**Gaseous emissions**
Tom Misselbrook
Inst. Grassland and Environmental Research, UK
Email: tom.misselbrook@bbsrc.ac.uk

**Heavy metals**
Fiona Nicholson
ADAS, UK
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**Management of organic wastes**
Giorgio Provolo
Istituto di Ingegneria Agraria, Italy
Email: Giorgio.provolo@unimi.it

**Composting and treatment of organic wastes**
Maria-Filar Bernal
Ctro de Edafologia y Biologia
Aplicada del Segura, Spain
Email: pbernal@natura.cebas.csic.es

**Information Technology**
Jan Venglovsky
University of Veterinary Medicine, Slovak Republic
Email: rami@ramiran.net

**Other wastes generated on the farm**
Paolo Balsari
DEIFA, Universita di Torino, Italy
Email: balsari@agraria.unito.it
Sunday, September 10

18:00 – 20:00  Registration (optional) at "Hobro-huset" in "The old Town" (next to "Helsingør Theater")
   Posters for the Monday session may be mounted

Monday, September 11

08:30  Registration at "Helsingør Theater" in "The old Town"

Welcome ceremony and Introductions
Chair:  Sven G. Sommer
09:30  Welcome address
   Professor Sven G. Sommer, chairman of the organizing committee
09:35  Welcome address
   Dr. José Martinez, coordinator of the Ramiran network
09:40  Welcome address
   Deputy Director Søren A. Mikkelsen, Danish Institute of Agricultural Sciences
09:50  Official opening of the conference
   Hans Christian Schmidt, Minister of Food, Agriculture and Fisheries

Efficiency and impact of livestock production systems
Chair:  Sven G. Sommer
I-1  A farm level approach for mitigating greenhouse gas emissions from ruminant livestock systems
   René L.M. Schils, Jørgen E. Olesen, Agustin del Prado and Jean-François Soussana
10:00

10:30  Coffee break

11:00  I-2  Nutrient losses from manure management
   Oene Oenema, Diti Oudendag and Gerard Velthof
11:30  I-3  Manure as a key resource to sustainability of smallholder farming systems in Africa: An introduction to the NUANCES framework
   Ken Giller, Nico de Ridder, Mariana Rufino, Pablo Tittonell, Mark van Wijk and Shamie Zingore
12:00  Announcements etc.
   Søren O. Petersen

12:15  Lunch and posters
Feed impact on slurry composition and emissions
Chair: Hanne D. Poulsen
14:00 I-4 Impact of nutrition on nitrogen, phosphorus and trace elements in pig manure and emissions in the air
Jean-Yves Dourmad and Catherine Jondreville
14:30 O-1 Reducing ammonia volatilisation from pig slurry through the reduction of dietary crude protein and the incorporation of benzoic acid
Fabrice Guiziou, Jean-Yves Dourmad, Patricia Saint Cast, Sylvie Picard and Marie-Line Daumer
14:45 O-2 Diet influence on ammonia emissions in lactating dairy cows
Merino P., Arriaga H., Salcedo G., Marton L. and Pinto M.
15:00 O-3 Modelling methane emission from dairy cows
Allan Danfaer and Martin Riis Weisbjerg
15:15 O-4 Dietary electrolytes affect slurry composition and volume from dairy cows
J. Sehested and P. Lund

Poster session incl. refreshments
15:30 P-101 Cattle slurry digestion does not improve the long term nitrogen use efficiency of farms
Jaap Schröder and Dik Uenk
P-102 Overview of evaluations of alternative swine manure management systems in North Carolina, USA
Philip Westerman
P-103 Managing dirty water to reduce slurry volumes on UK dairy farms
J.A. Laws and D.R. Chadwick
P-104 Treatment of sewage sludge with zeolite alone or in combination with lime on selected parasitological and bacteriological parameters
Jan Venglovsky, Nada Sasakova, Jose Martinez, Milada Vargova, Olga Ondrasovicova, Miloslav Ondrasovic, Kornelia Culenova and Ingrid Papajova
P-105 Salmonella reduction in manure by the addition of urea and ammonia
J.R. Ottoson, B. Vinnerås and A. Nordin
P-106 Effect of integrated forage rotation and manure management systems on soil carbon storage
Enrico Ceotto, Lamberto Borrelli, Rosa Marchetti and Cesare Tomasoni
P-107 Manure organic carbon inputs and soil quality
Anne Bhogal, Fiona Nicholson & Brian Chambers
P-108 Recycling organic wastes from food production: the GRUB’S UP perspective
Maria-Pilar Bernal
P-109 Quantifying heavy metal inputs to agricultural soils in England and Wales
F.A. Nicholson and B.J. Chambers
P-110 Consumer attitudes and potential markets for composted food wastes in south west England
David Tompkins and Rob Parkinson
P-111 Whole-farm nitrogen balances on Basque Country dairy farms
O. del Hierro, A. Artexte and M. Pinto

P-112 Effect of sexual neutralization on fattening Piemontese male calves’
nitrogen excretion
Davide Biagini and Carla Lazzaroni

P-113 Explaining the diversity of environmental performances according to
a typology of farming practices combinations: the case of the dairy
cattle breeding in Réunion Island
Vayssières, J., Lecomte, P., Guerrin, F., Bocquier, F. and Verdet, C.

P-114 Dietary and faecal phosphorus levels in commercial dairy farms of the
Basque Country
Arriaga H., Pinto M., Calsamiglia S. and Merino P.

P-115 Assessment of the balance between livestock effluent production and
nutrient demand by crops in a small agricultural area of The Reunion
Island
Jean-Michel Médoc, Thierry Raimbault and Bruce Ayache

P-116 Environmental risk assessment of manure management
Provol G. and Ferrari O.

P-117 Effect of ration on faecal nutrient output from sheep and dairy cows
Martin Riis Weisbjerg, Peter Lund and Torben Hvelplund

P-118 Comparison of models used for the calculation of national ammonia
emission inventories from agriculture in Europe
H. Menzi, B. Reidy, U. Dämmgen, H. Döhler, B. Eurich-Menden, F.K. van
Evert, N.J. Hutchings, H.H. Luesink, H. Menzi, T.H. Misselbrook, G.-J. Monteny
and J. Webb

P-119 Historical development of livestock and manure management in
Switzerland
Beat Reidy, Peter Moser and Harald Menzi

P-120 The composition of faeces and urine from slaughter pigs and
gestating sows is determined by diet composition
José A. Fernández

P-121 Transport of estrogenic hormones and faecal bacteria through
structured soils amended with manure from a weaner producing farm
Jeanne Kjær, Preben Olsen, Kaare Johnsen, Carsten Suhr Jacobsen and Bent
Halling

P-122 Use of different manures and organic wastes in the suppression of the
cereal cyst nematode Heterodera avenae by biofumigation
Javier López-Robles, Casilda Olalla, Carlos Rad, Yolanda Arribas, Milagros
Navarro, Juana Isabel López-Fernández and Salvador González-Carcedo

P-123 Survival of Ascaris suum eggs and Eimeria oocysts during composting
Papajová, I., Juriš, P., Szabová, E., Venglovský, J. and Sasáková, N.

P-124 Phosphorus in pig manure is affected by dietary means
Hanne Damgaard Poulsen and Karoline Johansen

P-125 Quantification of nitrogen and phosphorus in manure in the Danish
normative system
Hanne Damgaard Poulsen, Peter Lund, Jakob Sehested, Nicholas Hutchings
and Sven G. Sommer
Manure management in developing countries
Chair: José Martinez
16:30 O-5 Chicken manure treatment and application – an overview of the ASIA-PRO-ECO project CHIMATRA
Ina Körner, Henrich Roeper, Helmut Adwiraah, Rainer Stegmann, Jan Huismans, Nico Ogink, Ahmad Makmom Abdullah, Mohd Nasir Hassan, Wan Nor Azmin Sulaiman and Thiam Ming Chee
16:45 O-6 Manure management practices in Mexico and In-vessel composting of food wastes in the UK: feedstock and output characteristics
Joel Velasco-Velasco, David Tompkins and Rob Parkinson
17:00 O-7 Farm location and manure management practices - Insights from a case study on pig production in Central Thailand
Pierre Gerber, Harald Menzi and Henning Steinfeld
18:30 Mayors reception at the City Hall

Tuesday, September 12

Manure and waste management strategies
Chair: O. Oenema
08:30 I-5 The contribution of separation technologies to the management of livestock manure
C.H. Burton
09:00 I-6 Interactions between biomass energy technologies and nutrient and carbon balances at the farm level
Uffe Jørgensen and Bjørn Molt Petersen
09:30 I-7 Biosecurity and arable use of manure and biowaste
Ann Albihn and Bjørn Vinnerås
10:00 Coffee break
10:30 I-8 The present status of rapid methods for on-farm analysis of manure composition with emphasis on N and P: What is available and what is lacking?
James B. Reeves, III
11:00 Plenum discussion

Physical/chemical treatment methods
Chair: C. Burton
11:30 O-8 Slurry acidification – consequences for losses and plant availability of nitrogen and sulphur
Jørgen Eriksen and Peter Sørensen
11:45 O-9 Innovative technology for recycling of manure phosphorus with rapid amorphous phosphate precipitation
A.A. Szogi, M.B. Vanotti, P.J. Bauer, K.G. Scheckel and W.H. Hudnall
12:00  O-10  **Removal of Salmonella contamination before using plant nutrients from household waste and wastewater in agriculture**  
*Vinnerås, B., Nordin, A., Ottoson, J., Berggren, I., Albin, A., Bagge, E. and Sahlström, L.*

12:15  O-11  **Effects of slurry additives and ozone treatment on odour emissions from pig slurry**  
*Martin N. Hansen, Morten Bang, Arne G. Hansen and Anders Feilberg*

12:30  **Lunch and posters**

14:00  O-12  **Wet oxidation pre-treatment-- the way to improve economics of energy production from manure?**  
*Hinrich Uellendahl and Birgitte Ahring*

14:15  O-13  **Optimal plant nutrient distribution in and biogasification of manure separation products, separated with FeCl3 as coagulant**  
*Malbrit Hjorth, Tavs Nyord, Anders M. Nielsen and Sven G. Sommer*

**Biological treatment methods**  
*Chair: M.P. Bernal*

14:30  O-14  **Monitoring and optimisation of biogas production**  
*Alastair Ward, Phil Hobbs, Peter Holliman and Davey Jones*

14:45  O-15  **Anaerobic co-digestion of pig manure with fruit wastes. Process development for the recycling in decentralised farm scale plants**  
*Luis J. M. Ferreira*

15:00  P-229  **A new technology to process swine manure**  
*Anni Kokkonen, Erkki Aura and Risto Seppälä*

**Poster session incl. refreshments**

15:15  P-201  **Biogas production and process kinetics in serial coupled anaerobic digesters**  
*Anders Michael Nielsen and Henrik Bjarne Møller*

P-202  **Biogas Forum Austria: network for research, extension service, and commercial farms**  
*Thomas Amon, Barbara Amon, Vitaliy Kryvoruchko, Katharina Hopfner-Sixt, Andreas Moser and Werner Zollitsch*

P-203  **Monitoring of energy crop digestion in Austria**  
*Katharina Hopfner-Sixt, Thomas Amon, Dejan Milovanovic and Barbara Amon*

P-204  **European Biogas Initiative to improve the yield of agricultural biogas plants (EU-Agro-Biogas)**  
*Thomas Amon, Barbara Amon, Andrea Machmüller, Katharina Hopfner-Sixt, Vitaliy Kryvoruchko and Vitomir Bodiroza*

P-205  **Process performance of biogas plants integrating pre-separation of manure**  
*Henrik B. Møller, Anders M. Nielsen, G. Hastrup Andersen and Ryoh Nakakubo*
P-206 Impact of peat and polystyrene ball covers on ammonia emissions from the storage and spreading of pig slurry: a farm-scale study
L Loyon, F. Guiziou, S Picard and P Saint-cast

P-207 Ammonia emission from the management of solid fraction derived from the mechanical separation of slurry
Fabrizio Gioelli, Paolo Balsari, Elio Dinuccio and Eliana Santoro

P-208 Optimising degradation of PAHs in soils using different composting approaches
Nadine Loick, Phil J. Hobbs, Mike D. Hale and Davey L. Jones

P-209 Proportions and characteristics of particle size fractions in two different cattle slurries
D. Fangueiro, R. Bol and D. Chadwick

P-210 Assessment of the potential N mineralization of six particle size fractions of two different cattle slurries
D. Fangueiro, R. Bol and D. Chadwick

P-211 Characterization of pig slurries and treatment efficiencies in Central Spain
Eloy Bécares, Linda A. Torres-Villamizar, Roberto Reinoso, Juan. A. Alvarez, Mari Cruz García and Cristina León

P-212 Determination of the organic matter biodegradability using physico-chemical and biological fractionation
Fabrice Béline, Céline Druihe, Sylvie Gillot, Jean-Michel Helmer, Vassilia Vigneron, Patricia Saint-Cast, Fabien Vedrenne, Lucie Berthe, Stéphane Bons, Cécile Miège, Catherine Gourlay and Jean-Marc Choubert

P-213 Assessment of the performances of different mechanical solid-liquid separators for pig and cattle slurries
Paolo Balsari, Eliana Santoro, Elio Dinuccio and Fabrizio Gioelli

P-214 Development of an agglomeration-based technology to transform chicken manure into an user-friendly fertilizer
Ina Körner, Henrich Roeper, Helmut Adwiraah and Rainer Stegmann

P-215 Electromediation of heavy metals from liquid manure
Jacek Dach and Dick A.J. Starmans

P-216 Composting of winery and distillery residues: Evaluation of the process by FT-IR
Marhuenda-Egea, F.C., Martínez-Sabater, E., Such-Basañez, I., Moral, R., Bustamante, M.A., Paredes, C. and Perez-Murcia, M.D.

P-217 Content of nutrients and trace elements in stored manure from laying hens
Eva Salomon and Lena Rodhe

P-218 Availability of P and K in ash from thermal gasification of animal manure
Gitte H. Rubæk, Peder Stoholm and Peter Sørensen

P-219 Co-composting of winery and distillery wastes with manure
M.A. Bustamante, C. Paredes, R. Moral, J. Moreno-Caselles, M.D. Perez-Murcia, A. Perez-Espinosa
P-220 Development of a pig slurry treatment system with SBR and MBR technology
León-Cófreces, C., García-González, M.C., Acítores, M. and Pérez-Sangrador, M.P.

P-221 Low temperature anaerobic digestion for swine mortalities disposal and recovery of green energy
Daniel I. Massé, Lucie Masse, Jean-François Hince and Candido Pomar

P-222 Influence of physical characteristics during composting of the solid fraction of dairy cattle slurry

P-223 Anaerobic digestion and composting of the organic fraction of municipal solid waste: process control and quality
Marta García-Albacete, Eduardo Tolosa, Esperanza Carvajal and M.Carmen Cartagena

P-224 Improving the treatment of slaughterhouse wastewaters by reed bed filters
Cristin Borda, Daniela Borda and Silvana Popescu

P-225 Manure management technologies in Poland: costs and environmental impacts
Jacek Dach, Bartosz Golik, Zbyszek Zbytek and Jacek Przyby

P-226 Effect of natural zeolite, a slurry additive, on physicochemical slurry properties and aerial ammonia concentration in the pig farm nursery
Dinka Milić, Alenka Tofant, Anamarija Farkaš and Jan Venglovský

P-227 Nutrient recovery from ash after incineration of organic residues
Ludwig Hermann

P-228 Behaviour of the organic matter and related methane production during anaerobic degradation of stored slurries
Fabien Vedrenne, Fabrice Béline and Nicolas Bernet

P-229 A new technology to process swine manure
Anni Kokkonen, Erkki Aura and Risto Seppälä

Waste microbiology and bioaugmentation
Chair: A. Albihn

16:15 O-17 Behaviour of enteric micro-organisms in Canadian and French swine manure treatments
Anne-Marie Pourcher, Nora Aktouche, Caroline Côté, Pierre Rousseau, Stéphane Godbout and José Martinez

16:30 O-18 Managing manure by a greater understanding of its metabolic profile? Adopting new technologies
Philip John Hobbs, Matt Wade, Jon Williams and Dan Dhanoa

16:45 O-19 Development of Anaerobic Ammonium Oxidation (Anammox) technology using immobilized biomass from swine manure
Matias Vanotti, Ariel Szogi, Airton Kunz and Maria Cruz García Gonzalez

17:00 O-20 The effect of bioaugmentation on selected microbial parameters of swine slurry pits
Linda A. Torres-Villamizar, Roberto Reinoso, Juan. A. Alvarez, Mari Cruz García, Cristina León and Eloy Bécares
Wednesday, September 13

08:30  **Ramiran Working Group session**
Reports from Ramiran working groups:

*Introduction*

J. Martinez

1. **Heavy metals**
   
   F. Nicholson

2. **Gaseous emissions**
   
   T. Misselbrook

3. **Hygienic aspects**
   
   R. Böhm

4. **Composting and transformation or organic wastes**
   
   M.P. Bernal

5. **Management of organic wastes**
   
   G. Provolo

6. **Other wastes generated on the farm**
   
   P. Balsari

7. **Information technology**
   
   J. Venglovsky

10:00  **Coffee break**

**Nutrient balances at the field level**

*Chair: F. Nicholson*

10:30  **O-21 Strategies to reduce diffuse nitrogen pollution from cattle slurry applications**

J.R. Williams, E.Sagoo, B.J. Chambers, J. Lapworth, D.R. Chadwick and J.A. Laws

10:45  **O-22 Nitrous oxide emissions from riparian buffers and treatment wetlands**

Patrick G. Hunt, Terry. A. Matheny, K.S. Ro, and Ariel. A. Szogi

11:00  **O-23 Land application of solid and liquid fractions from sedimented dairy slurry**


11:15  **O-24 Utilization and losses of nitrogen and phosphorus from field-applied slurry separation products**

Torkild Birkmose, Peter Sørensen and Gitte H Rubæk

11:30  **O-25 Uptake of cation micronutrients by wheat from two different animal manures applied to a sandy loam soil**

Claudia M.d.S. Cordovil and Fernanda Cabral
Quantifying NH3 and GHG emissions
Chair: T. Melselbrook
11:45 O-26 NH3 and GHG emissions from a straw flow system for fattening pigs: housing, and manure storage
Barbara Amon, Vitaliy Kryvoruchko, Martina Fröhlich, Thomas Amon, Alfred Pöllinger, Irene Mösenbacher and Anton Hausleitner
12:00 O-27 Effect of littered systems on pollutant emissions in gestating sows
Carlos Pineiro, Ana Isabel Pérez, Pilar Illescas, Gema Montalvo, Mariano Herrero, Rafael Giráldez, Mª José Sanz and Manuel Bigeriego
12:15 Lunch and posters
14:00 O-28 Nitrous oxide and di-nitrogen losses following application of livestock manures to agricultural land
Rachel Thorman, David Chadwick, Fiona Nicholson and Brian Chambers

Environmental impacts at the farm level
Chair: K. Giller
14:15 O-29 Inventory of gaseous emissions (CH4, N2O, NH3) from livestock manure management in France using a mass flow approach
Armelle Gac, Fabrice Béline, Thierry Bioteau and Katell Maguet
14:30 O-30 A farm-scale internet-based tool for assessing the effect of intensification on losses of nitrogen to the environment
N.J. Hutchings, I.S. Kristensen, N. Detlefsen, B.M. Petersen and M.S. Jørgensen
14:45 O-31 Ammonia concentrations around 5 farms in the Central Plateau of Spain
Mª José Sanz, Carlos Monter, Mónica Vázquez, Francisco Sanz, Gema Montalvo, Pilar Illescas, Carlos Pineiro and Manuel Bigeriego
15:00 O-32 Simulation of Odour dispersion by natural windbreaks
Xingjun Lin, Suzelle Barrington, Jim Nicell and Denis Choiniere
15:15 O-33 Comparison of models and measurements for whole-farm ammonia emissions
15:30 Poster session incl. refreshments

P-301 Nitrous oxide and methane emissions from unmanaged wet areas of intensive dairy systems
P-302 Research for climate protection: technological options for mitigation (Reclip:tom)
Barbara Amon, Martina Fröhlich, Marion Ramusch and Wilfried Winiwarter
P-303 Ammonia emission rates after application of slurry by different techniques in dry grasslands and arable fields in the Central Plateau of Spain
Mª José Sanz, Carlos Monter, Roberto Antequera, Francisco Sanz, J. L. Palau, Gema Montalvo, Pilar Illescas, Carlos Pineiro and Manuel Bigeriego

P-304 ‘Beef and chips’ – environmentally friendly overwintering of cattle on woodchip pads
K.A. Smith, J.A. Laws and F.A. Agostini

P-305 Ammonia and greenhouse gas emissions from pig slurry – the effect of slurry fermentation, separation of the fermentation product and application technique
Kristina Regina and Paula Perälä

P-306 The effect of cow slurry fermentation and application technique on greenhouse gas and ammonia emissions from a grass field
Paula Perälä and Kristina Regina

P-307 Ammonia emissions from swine manure storage tank
Frédéric Pelletier, Stéphane Godbout, Jean-Pierre Larouche, Stéphane P. Lemay and Alfred Marquis

P-308 The effect of cattle-slurry electroflotation on grassland yield
Sergio Menéndez, Pilar Merino, Mirian Pinto, Aritz Lekuona, Laszlo Márton, Carmen González-Murua and Jose María Estavillo

P-309 New parameters for evaluation of environmental impacts from cattle slurry and mineral fertilizer surface-applied to grassland
Teruo Matsunaka and Takuji Sawamoto

P-310 Agronomic use of exhausted grape marc composts on tomato crop: Yield, biomass production and morphological aspects
Moral, R., Bustamante, M.A., Moreno-Caselles, J., Perez-Murcia, M.D., Perez-Espinosa, A., Paredes, C. and Ruiz, J.J.

P-311 Reduction in nitrate leaching for a sustainable agriculture
Albrecht Siegenthaler and Werner Stauffer

P-312 Use efficiency of phosphorus applied with animal manure to organically and conventionally managed soils
Astrid Oberson, Hans-Ulrich Tagmann, David Dubois, Paul Mäder and Emmanuel Frossard

P-313 Effect of time and rate of cattle-slurry application on nitrate concentration of drainage water in a double-cropping forage system
Henrique Trindade, José Luís Pereira, João Coutinho and Nuno Moreira

P-314 Leaching of organic matter and metals from pig slurry before and after solid-liquid separation
Carlos de la Fuente and María-Pilar Bernal

P-315 Influence of application rate and method on nitrogen losses from slurry applied to grassland

P-316 Nitrogen and phosphorus losses following cattle slurry applications to a drained clay soil at Brimstone Farm
Elizabeth Sagoo, John R. Williams, Brian J. Chambers, Roy Cross, Jeff Short, Andrew Portwood and Robin A. Hodgkinson
P-317 Grass forage yield and soil mineral nitrogen as influenced by fertilization type and slurry application techniques
Dolores Báez and Juan Castro

P-318 Fractionation of copper and lead in a soil column amended with an anaerobic municipal sewage sludge
G. Egiarte, A. Agnelli, M. Camps Arbestain, G. Corti, E. Ruíz-Romera, M. Pinto

P-319 Analysis of malodorous volatile organic compounds in the air around dairy cow manure with HS/SPME GC-MS
Joana Larreta, Haritz Arriaga, Pilar Merino, Asier Alonso, Olatz Zuloaga and Gorka Arana

P-320 Agricultural value of the spent mushroom substrate

P-321 Assessment of manure management systems in Austria and improvement of the emission inventory
Barbara Amon, Martina Fröhlich and Thomas Amon

P-322 Measures to decrease ammonia emission from solid manure storages
Lena Rodhe, Gustav Rogstrand, Marianne Tersmeden and Jan Bergström

P-323 Nitrification activity of soil polluted with copper and zinc after intensive pig slurry application
Vesselin Koutev, José Martinez, Gérard Guiraud and Christine Marol

P-324 A methodology for the sizing of slurry storages, and for measuring nutrient excretion on dairy farms
Castro J., Novoa R., Báez D. and López J.

P-325 Assessment of nitrate pollution sources in pig-farms producing liquid manure (Case study)
Csaba Juhász, Tibor Bíró, János Tamás and Elemér Kovács

16:30 Plenum discussion and closure
Thursday, September 14

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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>8.00</td>
<td>Departure, Radisson Hotel Aarhus</td>
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<td>8.10</td>
<td>Departure, Scandic Hotel Plaza, Aarhus</td>
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<td>8.20</td>
<td>Departure, Hotel CabInn, Aarhus</td>
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<td>9.00 – 09.45</td>
<td>InFarm A/S, Haslundkærvej, Randers (slurry acidification)</td>
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<td>10.20 – 11.05</td>
<td>Kemira Miljø A/S &amp; BioScan A/S, Højmarken, Randers (separation, presentation of separation+centralized AD concept)</td>
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<td>11.30 – 12.10</td>
<td>Guided (bus) tour at Danish Institute and Agricultural Sciences, Foulum, introduction to new biogas research facility</td>
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<td>12.15 – 13.15</td>
<td>Lunch at Danish Institute and Agricultural Sciences, Foulum</td>
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<td>13.45 – 14.30</td>
<td>Lake restoration project at the scenic Lake Hald</td>
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<td>14.45 – 15.15</td>
<td>Coffee at “Niels Bugges Inn”</td>
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<td>15.15</td>
<td>Departure</td>
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<td>16.30</td>
<td>Arrival at Aarhus Central Station</td>
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Each year Danish farmers handle 34 million tonnes of animal manure, which is applied to fields. There is much focus on the environmental impact and nutrient use efficiency of animal manure and other residues in the public debate and in the scientific and industrial sectors, and this is already reflected in the legislation.

However, increasing demands for an environmental friendly livestock production are anticipated in the future. In order to fulfil these demands both farmers and industry have an interest in better coordination of the resources spent on research and technological development. To achieve this, the Danish Institute of Agricultural Sciences has founded the Knowledge Centre of Animal Manure and Biomass Technology.

The centre will both collate the existing knowledge and launch new scientific projects and ideas to ensure that both the scientists, the authorities, and the industrial sector through cooperation and a holistic research approach bring the resources to the best possible use.

The Knowledge Centre operates in close cooperation with scientists, research institutions, and companies within the manure and biomass treatment sector – and with governmental authorities and farmers.