



ReUseWaste

Recovery and Use of Nutrients, Energy and Organic Matter from Animal Waste
- Rethinking Sustainable Resource Recycling for Food Security

Background

Global demand for animal products is expected to double by 2050. Increased global livestock production has great impacts on the environment and increases global warming. Livestock production in agriculture requires enormous inputs of resources such as land, energy, water and nutrients.



Regions of Europe with intensive livestock farming and consequently large N and P surpluses (Source: JRC: EUR-22334, 2006)

Research concept

Livestock manure is a heterogeneous and complex substrate composed of organic matter and plant nutrients. Positive effects of manure recycling and management are multiple and often interwoven.

Characterisation

- Fractionation
- Thermogravimetry
- Spectroscopy
- Pyrolysis-GC/MS
- ICP/IRMS
- NIR/MIR
- XANES

Function

- Energy source
- Crop fertiliser value
- Soil quality amelioration
- Carbon sequestration

Assessment

- System analyses
- Stakeholder analyses
- Life cycle assessment
- Integrated sustainability

Animal waste = environmental challenge... but also a valuable resource:
- Nutrients
- Organic Matter

Treatment

- Liquid-solids separation
- Acidification/inhibitors
- AD / Biogasification for energy
- Incineration/Gasification/Pyrolysis
- Composting
- Waste upgrading/Nutrient recovery
- Bio-fertilizer production

Utilisation

- Crop field application
- Horticultural growth media
- Landscaping
- Soil remediation

ReUseWaste research activities will form the basis for the development of new manure treatment options, new manure utilisation opportunities as well as integrated sustainability assessments.

About ReUseWaste

ReUseWaste is a multi-site and multidisciplinary **Initial Training Network**, bringing together major EU research groups, key agri-environmental technology companies and public authorities, from the countries and regions of most intensive livestock production in Europe. ReUseWaste is funded under the **Marie Curie action** of the EU-FP7-PEOPLE-2011 program and will run over the period 2012-2015.

The **overall objective** of ReUseWaste is to educate young scientists to rethink current, established manure management systems and apply new technology for improved and sustainable utilisation of the valuable organic matter and nutrient resources in manure.

The **specific objectives** of the project are to:

- ✦ **Train** 13 young scientists in sustainable animal manure utilisation and management processes and develop their personal and professional skills
- ✦ Develop **new tools for characterisation** of manure
- ✦ Develop **new technologies for treatment, separation and bioenergy and nutrient recovery** from manure
- ✦ **Improve and assess** the performances of **manure treatment products** following their application to land
- ✦ **Synthesize** the developed knowledge into **new manure management systems**

Training

- ✦ Professional guidance to continuously develop individual research competences
- ✦ Curriculum of discipline specific, multi-disciplinary and complementary courses (see www.reusewaste.eu/training)
- ✦ Network partner training and secondment activities

Outputs

The ReUseWaste network will result in:

- ✦ 13 skilled researchers in sustainable manure technology systems development
- ✦ Technologies developed for both bioenergy and "green" bio-fertiliser recovery from manures, leading to improved soil, water and air quality
- ✦ New innovation and business opportunities for agricultural clean-tech companies

Research activities and fellows

<p>Postdoc 4.1: Development of enhanced mechanical separation efficiency by combined separation techniques, pre- and post-treatment (Olga Popovic, UTO Italy)</p>	<p>PhD 4.2: Development of combined acidification and separation: impact on manure and slurry fractions composition and gas emission (Iria Carrera, ISA-UTL Portugal)</p>	<p>PhD 4.3: Development of membrane technology for production of concentrated fertiliser and clean water (M. Salud Camilleri Rumbau, SDU Denmark)</p>	<p>PhD 4.4: Development of composting technology for bio-fertiliser production (André Santos, CSIC Spain)</p>
<p>PhD 3.1: New spectroscopic methods for determining manure composition and degradability (George Bekiaris, UCPH Denmark)</p>	<p>PhD 5.1: Development of anaerobic digestion methods for optimal yield and P recovery from animal manure production (Phuong Thuy Vu, WU Netherlands)</p>	<p>PhD 5.2: Development of thermal treatment technologies (pyrolysis and gasification) for low moisture and dehydrated manure feedstock (Natalie Taupe, ULIM Ireland)</p>	<p>PhD 5.3: Optimal combustion technology for on-farm conversion of animal manures to heat and ash (Daya Shankar Pandey, ULIM Ireland)</p>
<p>PhD 6.1: Field application and gas emissions of slurry treated by additives and mechanical separation (Maxwell Owusu-Twum, UTAD Portugal,)</p>	<p>PhD 6.2: Land utilisation, crop nutrient value and GHG emission of digestate and compost-based biofertilisers (Raghunath Subedi, UTO Italy)</p>	<p>PhD 6.3: Assessment of soil quality effects and nutrient availability of manure ash and biochar based biofertilisers (Athanasios Pantelopoulos, UCPH Denmark)</p>	<p>Postdoc 7.2: Evaluation of market acceptability of manure derived biofertiliser products (Sean Case, UCPH Denmark)</p>

Partners



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