

Professors involved:

Agustin del Prado, researcher, Basque Center for Climate Change (BC3), Bilbao, Spain.

David Fangueiro, researcher, UIQA, ISA, Portugal

Dave Chadwick, professor, Bangor University, UK

Henrique Trindade, professor, CITAB, UTAD, Portugal.

João Coutinho, professor, Chemistry Center, UTAD, Portugal.

José Luís Pereira, professor, Escola Superior Agrária - IPV, Portugal.

Laura Cardenas, researcher, Sustainable Soils and Grassland Systems, Rothamsted Research – North Wyke, UK.

Sven G. Sommer, professor, Institute of Chemical Engineering, Biology and Environmental Engineering, University of Southern Denmark.

Practical info:

Course language: ENGLISH

Location:

- University of Trás-os-Montes e Alto Douro, 5001-801 Vila Real, Portugal
- Instituto Superior de Agronomia, 1349-017 Lisboa, Portugal

Online registration and additional information:

<http://www.utad.pt/vPT/Area2/OutrasUnidades/GabineteFormacao/formacoes/Paginas/Formações/gaseous%20emissions.aspx?top=&datestart=2013-04-12&pagenr=2&lst=1>

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Network training course 1.01.

Gaseous emissions from animal manure and biowastes – processes and measurement

25-30 November 2013

Organized by



This **International Training Course** entitled **Gaseous emissions from animal manure and biowastes – processes and measurement** is an MSc and PhD course organized by the Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB) from University of Trás-os-Montes e Alto Douro (UTAD) and by the Environmental Chemistry Research Unit (UIQA) from Instituto Superior de Agronomia (University of Lisbon). The course is integrated in the Marie Curie International Initial Training Network project “**ReUseWaste**-Recovery and Use of Nutrients, Energy and Organic Matter from Animal Waste”.

Aim and scope

This course provides the participants with updated information of processes for production and consumption of gaseous compounds (particularly of N and C) from soil and organic residues and with competences for running research activities at a post-graduation level when the application of methods for measuring gas fluxes are required. During the practical sessions of the course, participants will be introduced to different measurement methods and how to perform lab analysis using GC, infrared gas analyzers and other lab equipment in simulated experiments.

This course corresponds to 5 ECTS learning equivalents.

In particular the participants will achieve competence in:

- Processes and factors affecting trace gases production from soil and animal manures and biowastes;
- Fundamentals of measuring techniques and instrumentation;
- Methods for measuring emissions from animal housing, manure stores, field and laboratory experiments;
- Emissions estimates, models and emission factors, mitigation strategies and options;
- Data analysis and interpretation.

Course structure & Contents

Participation in the course will give students a fundamental understanding of processes responsible for gaseous emissions and hands on experience about the methodologies for measurement of gaseous emissions from animal manure and biowastes at the different lifecycle stages. Additionally, the course will give insight about mitigation strategies and best available techniques to minimize emissions according to an ecological, socio-economic and political point of view. Specific themes of the course will be:

- Nitrogen and carbon transformations in soils, animal manures and biowastes; retention and movement of nitrogen in soils.
- Environmental impacts associated to biogenic gaseous emission.
- Processes, factors regulating production and mechanisms involved on loss of methane, ammonia, nitrous oxide and other nitrogen compounds from soils and organic materials.
- Fundamentals of measuring techniques, sensors and technology.
- Methods for measuring ammonia volatilization from animal housing, manure stores, field and laboratory experiments.
- Methods for measuring nitrogen oxides, molecular nitrogen and methane emissions from animal housing, manure stores, field and laboratory experiments.
- Mitigation strategies for reducing gaseous emissions from animal manure and biowastes; management options and abatement techniques.
- Emission estimates; inventories and emission factors.
- Modeling gaseous emissions from agricultural systems

Final Course Seminar – *Research studies on greenhouse gases and ammonia emission* - Presentations from participants and invited speakers.

Evaluation procedure

Assessment will be based equally on the following two parts: (1) a short individual report (max. 10 pages) on the different methodologies applied during the practical sessions of the course and a group report (maximum 3 participants each) with oral presentation in the last day detailing the materials and methods of an experiment for measuring gaseous emissions.