



MINISTERIO
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CENTRO DE EDAFOLOGÍA Y BIOLOGÍA
APLICADA DEL SEGURA (CEBAS)

ReUseWaste PhD Fellowship: Development of composting technology for bio-fertiliser production

Department of Soil and Water Conservation and Organic Waste Management, Centro de Edafología y Biología Aplicada del Segura at Consejo Superior de Investigaciones Científicas is offering a 3 year PhD scholarship commencing JUNE 1st 2012 or as soon as possible thereafter.

The application deadline is April 16th 2012.

The Centro de Edafología y Biología Aplicada del Segura at Consejo Superior de Investigaciones Científicas announces an opening for a PhD fellowship (Early Stage Researcher) under an EU FP7 Marie-Curie Initial Training Network (ITN), entitled Recovery and Use of Nutrients, Energy and Organic Matter from Animal Waste, ReUseWaste (www.reusewaste.eu).

Project description

Background

Farm wastes (animal manures) are characterised by high plant nutrient concentrations, such as nitrogen (N), phosphorus (P) and potassium (K), which makes them potentially valuable soil organic fertilisers. However, the spread of these materials on agricultural land without an adequate management can lead to environmental risks, such as the emissions of greenhouse gases (GHG), the spread of pathogens and an excess of nutrients, such as N and P. The solid-liquid separation of animal slurries constitutes a simple technology with the potential to concentrate the nutrients and organic matter in the separated solids, which can be exported from high-density slurry-producing areas for land application or for other uses such as composting or bioenergy production.

The solid material from the pig slurry separation processes can be an excellent material for producing bio-fertiliser for specific end use through different treatments. These treatments include composting, which is a spontaneous biological decomposition process of organic materials in a predominantly aerobic environment. During the process, bacteria, fungi and other microorganisms break down organic materials into stable, usable organic substances called compost. Composting is a well-developed technology for transforming organic wastes into fertiliser products and substrates. This technology is gaining interest as a suitable option for manures, yielding economic and environmental advantages, since this process eliminates or reduces the risk of spreading of pathogens, parasites and weed seeds. However, it requires a deep and detailed knowledge of the optimisation of the composting process, according to the characteristics of the waste material, in order to deliver valuable products. To obtain balanced compost, co-composting with other by-products and additives will be necessary, in order to improve composting efficiency, reduce N-losses and obtain added-value biofertilisers. Also, the composted solid fraction of pig slurry could be an important source of organic matter for C-depleted soils of Southern Europe, serving a dual purpose: soil quality improvement and carbon (CO₂) sequestration.



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Objectives

The main objective is to develop improved composting technology for producing high quality organic fertiliser products from animal manures, hence reducing mineral fertiliser and chemical input into agricultural systems. Composting optimisation is needed to obtain bio-fertilisers; for this reason, co-composting and selection of additives will be included in this work.

The activity will focus on:

1. Defining the strategy for solid pig slurry composting: co-composting materials, start-up parameters, selection of additives.
2. Controlling the parameters for optimisation of the composting of solid pig slurry, in the bio-oxidative and maturation phases: emissions of gases, N-losses.
3. Composting for soil C-conservation: OM stabilisation and humic substances identification; implications in the soil C-cycle.
4. Compost quality: Chemical parameters and maturity standardisation; Fertiliser value: the capacity to supply macro and micronutrients for plant growth; Physical properties for soil-less substrates; Absence of pathogenic microorganisms; Other additional properties such as suppression of soil-borne diseases;
5. Testing the efficiency of the obtained fertiliser products (compost) in different agronomical scenarios under Mediterranean climate conditions: horticultural crops, and organic farming.

We are seeking a candidate preferably with a background in Chemistry, Agronomy or Soil Science

Job description

Your key tasks as a PhD fellow are:

- Manage and carry through your research project
- Take PhD courses within the ReUseWaste network
- Write scientific articles and your PhD thesis
- Participate in international congresses and ReUseWaste network meetings
- Stay at a research institution abroad or with an industry partner for a few months
- Participate in dissemination activities of the CSIC

Key criteria for the assessment of candidates

- A master's degree (or equivalent) related to the subject area of the project
- The grade point average (degree classification) achieved
- Professional qualifications relevant to the PhD programme
- Previous publications
- Relevant work experience
- Other professional activities



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- Fluency in English and basic knowledge of Spanish
- Knowledge in statistics, GIS, etc.
- Interpersonal skills
- Proposal for research activities

The successful candidates will participate in a Marie Curie international training network and will work in a highly interactive international environment with other Marie-Curie PhD students, researchers and industry. They will execute a part of the work during extended visits at the partner institutions outside of Spain (host country).

Formal requirements and eligibility

At the time of recruitment, it is a requirement that PhD candidates have not been awarded a doctorate degree and are in the first 4 years (full-time equivalent) of their research careers. Furthermore, at the time of selection by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in Spain for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.

Terms of employment

Recruitment is done in accordance with the rules set out by the FP7 Marie Curie Initial Training Networks.

The position will be held as a labor contract between the fellow researcher and CSIC in accordance with the Spanish legislation applicable to public entities. The fellow researcher will have a full Social Security coverage and all other social benefits established for CSIC employees.

Moreover, the salary of the candidate will be in accordance with the rules and regulations laid down in the Marie Curie Grant Agreement.

Application procedure

Applications – in English – must include:

- Cover Letter, stating which PhD project you are applying for and detailing your motivation, research interest and background for applying for the specific PhD project.
- CV
- Official copies of the University Diploma(s) and details of the subjects studied, with examination marks obtained.
- Other information for consideration, e.g. list of publications (if any), peer reviewed and other
- Two personal letter of Recommendation, by tutor(s), etc.
- A maximum of 3 relevant scientific works which the applicant wishes to be included in the assessment.
- A max 1-page proposal for research activities to pursue in the PhD project is highly recommended.
- Only applications with a letter of motivation for the specific position, incl. a description of the applicant's research interest, will be accepted



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The applicant will be assessed according to the principles of equality, merit and capacity, as well as the technical discretionarily of the Assessment Committee of the Network and according to the criteria stipulated for recruitment in FP7-PEOPLE-2011-ITN. The selection procedure conforms to the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

An assessment committee will be appointed to evaluate the applications. The ReUseWaste Steering Committee will promote three candidates chosen from the qualified applicants. The final selection of a successful candidate will be made by the principal supervisor following interviews. By the end of **May 2012**, all applicants will have received information regarding the evaluation of their application. Receipt of the application will not be acknowledged.

The CSIC welcomes applications from suitable qualified candidates regardless of age, gender, race, religion or ethnic background.

The application should be sent by post in two copies to Prof. Dr. M.P. Bernal, CEBAS-CSIC, Apartado 164, 30100 Murcia, Spain, or by e-mail to pbernal@cebas.csic.es and must be received no later than **April 16th 2012**. Applications received later than this date will not be considered.

Questions

For specific information about the PhD scholarship and the details of the project, please contact Dr M.P. Bernal email address pbernal@cebas.csic.es and the project web site (www.reusewaste.eu).