

**Year of CfP: 2008**

**Project No 0803-012**

<b>Project title:</b> Modelling and optimization of bioconversion of plant materials in inhomogeneous media
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**Units managing the project:** IATE (Agropolymer Engineering and Emerging Technologies) (CIRAD, INRA, Montpellier SupAgro, UMII), UMR ASB (*Analyse des Systèmes et Biométrie*) (INRA, Montpellier SupAgro), EPI MERE (INRA, INRIA)

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**Countries involved in the project:** Canada, Tunisia

**Sub-thematic axis:** STDI-2 (Socio-Technical Dynamics of Innovation 2: *Agrifood innovations, food and non-food use of plant crops*)

**Objectives:**

The biotransformation of plant materials consists of using microorganisms or enzymes to carry out a reaction that is more costly or not feasible non-biologically (A typical instance of such a process is the enzymatic hydrolysis, where switch-grass is mixed with well-selected enzymes that convert cellulosic material into sugars that will be fermented into ethanol). In an industrial context of "green chemistry", these reactions are elaborated and piloted in "bioreactors". From an economic point of view, using very large tanks filled with high substrate concentrations appears to be the most efficient. However taking into account spatial effects, managing the overall process is a challenging issue.

The aim of this project is to study the effect of spatial structuration on the dynamics of biocatalyzed reactions in non homogeneous reactors through a low complexity modelling approach. This problematic of generic concern (including industrial and natural reaction systems,) will be in a first approach based on the study of a model system. This system will be in an enzyme-catalyzed reaction performed in multi-fed stirred-tank bioreactors connected in series to mimic non homogeneous phenomena.

**Total Agropolis Fondation funding:** € 121,380 (salary for a post-doctoral fellow, travel, conference fees, laboratory expenses)

**Funding categorie(s):** Agropolis Fondation visiting fellowship, Agropolis Fondation post-doctoral fellowship

**Project duration:** 1 December 2008 – 31 January 2011

**Keywords:** bioconversion – biotransformation – bioreactors – modelling – green chemistry