Urban and livestock wastes in the tropics: Characterization and modeling of their transformations in soil to better choose their potential utilization

Thuriès, L.[1], Rabetokotany, N.[1, 2]

[1]CIRAD, Recycling and Risk Unit, BP20, 97408 Saint Denis Messagerie cedex9, Réunion Island (France) ; laurent.thuries@cirad.fr
[2]Laboratoire des RadioIsotopes, Soil and Climate Changes Unit, BP 3383, Route d'Andraisoro, 101 Antananarivo (Madagascar) ; nanoutwentytwo@yahoo.fr

Key words: organic wastes, near infrared spectroscopy, modeling, agricultural recycling, energy biovalorization

Abstract

The exogenous organic materials (EOM) resulting from agricultural activities within the city are numerous. We present here descriptions of these EOMs, and have modeled management problems and competition in disposing and using them (e.g. agricultural recycling vs. production of renewable energies). In the Indian Ocean region (Madagascar and La Réunion Island), both the volume and variety of EOM are increasing. We have developed innovative methods (e.g. near infra-red spectroscopy [NIRS]) to characterize a large variety of tropical EOM and to evaluate the risks involved in either their agricultural or energy utilization. In order to represent the EOM from various origins and of different types, the development of models is carried out on several levels. On the one hand, NIRS models are presented to make use of the technique. Indeed, on a "simple" spectrum basis, one can make predictions of interesting parameters which are difficult to measure according to conventional methods. Many useful data to assess the scenarios of agricultural or energy valorization can thus be quickly produced at lower costs. On the other hand, we have developed models of EOM transformations in soils that are adapted to the tropics. These models can provide scenarios for the agricultural valorization of typical EOM, and can run with entry parameters which have been measured by conventional analyses, or resulting from NIRS models (double modeling). The various scenarios set out for either agricultural or energy utilization must be balanced against possible hazards due to trace elements and the release of N_2O, a powerful greenhouse gas.

Developing the utilization of organic waste in truck farming in Senegal: opportunities, constraints and risks

Tounkara, S.[1], Zélem, M. C.[1]

[1]Université J.F. Champollion ERT SPEED, Place de Verdun 81000 Albi. France. tounkara_sidy@yahoo.fr, zelem@univ-tlse2.fr

Key words: Dakar, urbanization, truck farming, water, land, organic matter, representations, valorization, opportunities, constraints, risks

Abstract

Within a context of demographic and urban growth, and taking ecological requirements into consideration, can urban horticulture be one of the solutions for managing urban waste? How can a process for developing the use of organic matter in peri-urban agriculture be implemented in truck farming in Dakar (Senegal), where agricultural endeavors are frequently undermined by constraints such as access to irrigation water, levels of population pressure and insecurity, and access to supply of organic matter? The physical environment creates a context for utilizing organic matter by truck farmers (i.e. market-gardeners). Many players are involved in this situation, and each brings different rationales and ideas for using the many types of organic matter potentially available for truck farming (compost from cow, horse, sheep, poultry, slaughter-house, or fish manure; groundnut by-products; clarification sludge; etc.). However,