

## INQU 6029-8996 GRAD SEMINAR SERIES Winter/Spring 2009



**PRESENTATION TITLE:** Biotransformation of Coffee Pulp/Husk by Lignicolous Filamentous Fungi

**PRESENTER:** María del Pilar Sierra-Gómez

**ADVISOR:** Dr. Patricia Ortiz

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### ABSTRACT:

Agro-industrial residues have been increasingly proposed as substrates in several bioprocesses. This is mainly because the recycling of these residues contributes to solve prevailing pollution problems and waste management issues. Coffee pulp is the main byproduct in the wet processing of coffee; one of Puerto Rico's important agricultural commodities. Coffee pulp is close to 94% of the total weight of the coffee cherry, therefore innovative and environmentally friendly methods to reutilize this waste is necessary. The bioavailability of coffee pulp is restricted by the presence of recalcitrant and toxic compounds such as lignin, caffeine, and tannins. Therefore, we propose to utilize lignicolous filamentous fungi to detoxify and delignify coffee pulp to convert it into an amenable source of carbohydrates and protein. We have preliminarily screened twelve strains of lignicolous filamentous fungi for caffeine tolerance. These strains were inoculated in caffeine concentrations of 0.2, 0.5, 1.0 and 4.0%. Our preliminary results indicated that *Alternaria alternata* and *Chaetomium globosum* showed an unreported tolerance to caffeine of up to 1.0%. We will assess the degradation of caffeine by promising strains growing mycelial mats in liquid and identifying caffeine metabolites using chromatographic, spectroscopic and spectrometric approaches.

Solid-state fermentations will be carried out to assess the activity of lignicolous filamentous fungi on the coffee pulp. Experiments will be conducted on minimal nutrient conditions at pH 4.5-5.5 and 60-70% moisture. Chemical analysis of the degraded material will be conducted to assess the content of lignin, cellulose, caffeine, and lipids. These analyses will determine the extent of detoxification and delignification on the coffee pulp.

