Inactivation of high concentration of pathogens in land-applied food industry sludge

JM Méndez-Contreras*, J Atenodoro, FA Champión, NA Vallejo-Cantú and A Alvarado-Lassman

**Instituto Tecnológico de Orizaba (ITO), Av. Instituto Tecnológico, Col. Emiliano Zapata 94320, Orizaba, Ver. Mexico*

Abstract

In Mexico, as in other developing countries, the most important pollution and management problems of food-processing sludge are the high levels of pathogen microorganisms within the sludge and the lack of sites for its disposal. The aims of this study were to evaluate the effect of calcium oxide in the inactivation of pathogenic microorganisms and the subsequent use of the resulting product in an agricultural application at various agronomic rates. Stabilisation tests were done in a hermetically closed fibreglass reactor with 1.5 ℓ capacity, using physicochemical sludge with concentrations of 4, 8 and 12% of total solids (TS) and contact times of 30, 60 and 90 min. At the end of each treatment, the raw and treated sludge quality was evaluated. Recommended doses for Class A biosolids production were 20, 10 and 8% m/m of CaO for 4, 8 and 12% of TS respectively with a minimum contact time of 90 min. The land-application test was done using sludge with 8% TS treated with a quicklime dose of 10% m/m. Nitrogen-based Agronomic Rates (AR) of 0, 1, 5, 10 and 15 were evaluated in the cultivation and production of chayote (*Sechium edule*). The results with 5 AR showed an estimated total production of 70 kg of the vegetable species over a period of 90 d, which is higher than that reported for the same crop grown without biosolids application.

Keywords: land application, quicklime (CaO) treated biosolids, *Sechium edule* development, vertisols