

Title: MICROBIOLOGICAL ANALYSIS OF SEWAGE SLUDGE AND POTENTIAL AS USE AS FERTILIZER: DETECTION OF MULTIRESISTANT ENTEROBACTERIA

Authors: Oliveira, F.A.¹, Sommaggio, L.R.D.², Mazzeo, D.E.C.², Marin-Morales, M.A.², Levy, C.E.¹

Institution: ¹ Laboratório de Microbiologia Clínica – Hospital de Clínicas da Universidade Estadual de Campinas (Rua Vital Brasil, 251 Cidade Universitária, Campinas-SP), ² UNESP – Universidade Estadual Paulista, Instituto de Biociências de Rio Claro (Av. 24 A, 1515 – Jardim Bela Vista, Rio Claro –SP)

Sewage sludge (LE), generated in sewage treatment plants consists predominantly of organic matter and has potential use as agricultural fertilizer, although persisting concern about its toxicity, dissemination of potentially pathogenic bacteria and eventually carrying important resistance mechanisms. The aim of this project was to analyze the presence of multiresistant enterobacteria in LE samples from the Sewage Treatment Plant (WWTP) named Blue Beach in the city of Americana - SP. LE samples; LE + ground (3: 1, v / v) were placed in stainless steel vats for a period of 3 (T3M) and 6 (T6M) months respectively, and microbiological analyzes were performed to assess the T0, T3M T6M and the presence and persistence of multidrug-resistant Enterobacteriaceae. Samples were plated on blood agar and MacConkey agar Sabouraud agar at 35 ° C for 18 to 24 hours and then at room temperature for counting and isolating microorganisms in serial dilutions. The identification was carried out by biochemical tests and automation (Phoenix™ – BD Biosciences). The susceptibility testing was also performed by automation methodology (Phoenix™ – BD Biosciences). At the T0 in sludge samples and soil + sludge they were isolated 10⁵ CFU / mL of *Klebsiella pneumoniae*, *Enterobacter cloacae* and *E. coli*, 10⁴ CFU / mL of *Citrobacter koseri* and *Klebsiella oxytoca*. There was significant isolation of nonfermenting environmental bacteria (BGNNF) in counts exceeding 10⁵ CFU / mL of *Alcaligenes faecalis*, *P. fluorescens*, *P. stutzeri*, *Acinetobacter lwoffii* and *Chryseobacterium indologenes*. They were also isolated 10⁵ CFU / mL of *Bacillus spp.* and 10⁴ CFU / mL of filamentous fungi. At T3 predominated the BGNNFs. Enterobacteria persisted in 6M sample with counts less than or equal to 10⁴ CFU / mL, prevailing BGNNF and highlighting the *Bacillus spp.* and filamentous fungi with counts ≥ 10⁵ CFU / mL. Multiresistant enterobacteria were not isolated in these samples. The results show that enterobacteria persist for a long time in the ground, but did not present relevant resistance mechanisms, but the potential risk exists.

Keywords: sewage sludge, biodegradation, enterobacteria, multiresistant bacteria