Título: PROSPECTING AND MOLECULAR IDENTIFICATION OF BACTERIA TOLERANT TO DIURON, ISOXAFLUTOLE AND SULFENTRAZONE, AND ALSO ABLE TO SOLUBILIZE PHOSPHATES AND PRODUCE AUXIN, FROM SOIL OF CONTINUOUS SUGARCANE CROP

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Resumo:

In Brazil, the share of agriculture in gross revenue is predominant, and this uses up large amounts of herbicides, particularly in sugarcane plantations. In addition, the increasing pollution of water bodies and soil arising from the frequent use of herbicides in weed control is increasingly concerned environmentalists. It is necessary to search for alternatives that reduce the consumption of such products, and accelerate the decomposition of them before they reach groundwater, rivers, and affect soil fertility. Many of these agrochemicals may be degraded by a complex enzymatic arsenal from microorganisms present in contaminated soil and/or symbionts of rhizosphere or nematodes. In this study, 96 bacterial strains were isolated (agar nutrient) from samples of A-horizon (10 cm deep, then the organic material layer surface) of yellow clay latosol with a continuous sugarcane crop for at least 40 years, and under intense herbicide application. We evaluated their ability to tolerate different concentrations of diuron, isoxaflutole and sulfentrazone herbicides, in solid minimum medium (Jones & Edington 1968), and to degrade recalcitrant compounds such as lignocellulose, hydrogen peroxide and urea, as well as solubilizing insoluble phosphate and producing indole acetic acid in liquid medium. Among the 96 strains, 62 were able to grow on solid medium containing concentrations up to 1000 $mg.mL^{-1}$ of the herbicides, and from these, four strains were also able to degrade the recalcitrant compounds non herbicides, and solubilize insoluble phosphate. Such bacteria were subjected to morphological, biochemical and molecular characterization, and after amplification of the 16S rDNA genethey were identified as the isolates LBPMA- *Bacillus megaterium*, *Bacillus toyonensis*, *Lysinibacillus macroides* and *Alcaligenes faecalis*. The strains of *B. megaterium* and *A.faecalis* were more effective to degrade diuron after 96 h of growth in liquid medium containing this herbicide as the only source of carbon (HPLC- analysis), and were also the only ones able to produce auxin *in vitro*. The results suggest that these four microorganisms have potential for use in biodegradation of herbicides, plant growth promotion, and remediation of contaminated sites.

Palavras-Chave: biodegradation, bioremediation, resistance, plant growth promoting bacteria, indol acetic acid

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