

Título: *Pseudomonas aeruginosa* isolated from Brazilian soils harboring virulence genes and resistance to antibiotics and heavy metals.

Authors: Pitondo-Silva, A.¹, Gonçalves, G.B.^{1,2}, Stehling, E.G.¹

Institutions: ¹Faculdade de Ciências Farmacêuticas de Ribeirão Preto, USP, Ribeirão Preto-SP; ²Centro Universitário Barão de Mauá, Ribeirão Preto-SP.

Pseudomonas aeruginosa is an opportunistic pathogen which can possess numerous virulence factors which confer to it the ability to cause severe, acute and chronic infections. Due to its metabolic versatility and adaptability to a wide range of environments, species of *P. aeruginosa* have been well adapted to the selective pressures of the environment. In this sense, there are studies demonstrating the development of resistance to heavy metals in soils contaminated with these pollutants. Some studies even indicate that the development of resistance to heavy metals has a serious implication since it may contribute to the emergence of antimicrobial resistance. Thus, the simultaneous resistance to both antimicrobial and heavy metals associated with the presence of virulence genes, represents a potential threat to human health. Thus, this study aimed to isolate and characterize 50 isolates of *P. aeruginosa* obtained from soil samples with different cultures from the five Brazilian regions. These isolates were evaluated for antimicrobial and heavy metals resistance and presence of virulence genes. The isolates were isolated from soil samples and identified by growth at 42 °C and conventional biochemical tests. *P. aeruginosa* species were confirmed molecularly by the PCR of the *oprL* gene, using specific primers. The antimicrobial susceptibility test was performed by disc diffusion on Müeller–Hinton agar (Oxoid, UK) in accordance with the recommendations of the Clinical Laboratory Standards Institute (CLSI 2013) recommendations. Eight virulence genes were screened by PCR to determine the pathogenic potential of the isolates. The presence of six genes and phenotype of resistance to heavy metals, were determined by PCR and minimum inhibitory concentration respectively. The results demonstrated that the 50 environmental isolates of *P. aeruginosa* studied possess high level of resistance to aztreonam (90%, n = 45) and ticarcillin (74%, n = 37), and, to a lesser extent, to the antibiotic polymyxin B (8%, n = 4). Moreover, many heavy metal resistance genes were detected and all isolates carrying the genes were resistant to the respective heavy metals, most notably to copper, cadmium, zinc and cobalt. Numerous virulence genes were detected, reinforcing the pathogenic potential of soil isolates. In conclusion, *P. aeruginosa* isolated from soil of the five Brazilian regions, has great pathogenic potential and high levels of resistance to certain antibiotics and heavy metals.

Keywords: *P. aeruginosa*, soil, antimicrobial resistance, heavy metals, virulence genes.

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