

Title: Antimicrobial Resistance profile in soil bacteria obtained from different regions of Brazil

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Abstract:

Soil presents a large microbial diversity, being the most common bacteria genera *Bacillus*, *Clostridium*, *Arthrobacter*, *Pseudomonas*, *Rhizobium*, *Azotobacter* and *Nitrobacter*. In recent years, these bacteria have become increasingly resistant to antibiotics and, consequentially, organisms that are resistant to antimicrobial therapy have been found in nature, including to antibiotics that are used in clinical medicine nowadays. Some mechanisms related to drugs resistance are overexpression of efflux pumps, loss or reduced expression of porins, low affinity of PBPs and β -lactamases production, which can be found in the periplasmic space in Gram-negative bacteria and extracellularly in Gram-positive bacteria. The main objective of this work was to evaluate the profile resistance of soil bacteria isolated from different regions of Brazil. To perform this work, 40 unidentified Gram-negative bacteria were obtained from soil samples of different Brazilian cities and analyzed by antimicrobial susceptibility test, which was performed by disc diffusion on Mueller-Hinton agar in accordance with the recommendations of the Clinical Laboratory Standards Institute. The predominant resistance was observed to cefalotin (95%) and aztreonam (77,5 %) followed by ticarcillin-clavulanic acid (57,5%), imipenem (57,5 %), gentamicin (57,5 %), ceftriaxone (57,5 %), polymyxin (42,5 %), tobramycin (40%), meropenem (37,5 %), ampicillin (20%), ceftazidime (17,5 %), cefepime (17,5 %) and piperacillin-tazobactam (7,5 %). All isolates were susceptible to ciprofloxacin, ofloxacin and norfloxacin. The multi drug resistance phenotype was observed in 32 isolates (80%), which presented resistance to three or more different classes of antibiotics and all isolates showed resistance to one or more β -lactam.

In conclusion, the present results demonstrate the potential of environmental isolates obtained from soil to acquire resistance, mainly for β -lactam antibiotics. As bacterial isolates from soil plantations can be close to bacteria and fungi that produce antibiotics and they are in contact with human activity, these isolates can serve as a reservoir of resistance determinants and this may be the explanation for the multi-resistant profile in isolates from soil. These results also suggest that restrictions on the use of antibiotics are necessary to change the current situation.

Keywords: Antibiotic resistance, soil bacteria, β -lactam antibiotics.

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