

TITLE: MULTIDRUG-RESISTANT *Pseudomonas aeruginosa* STRAINS ISOLATED FROM A PHARMACEUTICAL INDUSTRY

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ABSTRACT:

Antimicrobial resistance threatens the effective prevention and treatment of an ever-increasing range of infections. In 2017, the World Health Organization published a priority list regarding “antibiotic-resistant pathogens” and categorized carbapenem-resistant *P. aeruginosa* as a critical priority. *P. aeruginosa* is associated with nosocomial infections, mainly in intensive care units. Isolation of *P. aeruginosa* during manufacturing of biological products must be investigated, as the persistence of these bacterial species is mainly associated with the development of resistance to antimicrobial agents. The aim of this study was to evaluate the antimicrobial susceptibility profile of forty *P. aeruginosa* strains isolated from purified water (n=18), active pharmaceutical ingredient (n=14), intermediary process solutions (n=5), and potable water (n=3) in a pharmaceutical industry. VITEK® AST-N239 cards, which included seven classes of antimicrobials, were used and the minimum inhibitory concentration (MIC) were determined. All strains were susceptible to amikacin (MIC ranging <16); “susceptible, increased exposure” to piperacillin/tazobactam (MIC ranging from 0.002 to 16), ciprofloxacin (MIC ranging from 0.002 to 0.25) and ceftazidime (MIC ranging from 0.002 to ≤4); and gentamicin (MIC ranging from 0.6 to ≤2). Two (5.0%) strains were resistant to ceftazidime (MIC=16) and the remaining 38 strains were “susceptible, increased exposure” (MIC ranging from 0.002 to ≤8). One (2.5%) strain showed resistant to imipenem (MIC≥16) and “susceptible, increased exposure” to meropenem (MIC=4). The remaining strains (97.5%) were “susceptible, with increased exposure” to imipenem (MIC ranging from 0.002 to ≤2). All strains were classified as multidrug-resistant (MDR) because showed resistant and/or “susceptible, increased exposure” to more than five distinct classes of antimicrobials (aminoglycosides, carbapenems, cephalosporins, fluoroquinolones, penicillins + β-lactamase inhibitors). Considering the necessity to use broad-spectrum antibiotics in cases of *P. aeruginosa* infections, and the growing concern about carbapenem-resistance, the dissemination of MDR *P. aeruginosa* strains found in this study in the industry environment is a public health problem. It is known that potable water is the most common source of introduction of *P. aeruginosa* in pharmaceutical industrial environment. Therefore, it is necessary to monitor and implement control measures to eliminate these strains.

Keywords: *Pseudomonas aeruginosa*, antibiogram, multidrug-resistant, pharmaceutical industry.

Development Agency: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ).