

TITLE: VIRULENCE, ANTIMICROBIAL SUSCEPTIBILITY AND GENETIC SIMILARITY OF *Salmonella* Heidelberg ISOLATED FROM FOOD AND HUMANS

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ABSTRACT:

Salmonella, Heidelberg is related to outbreaks of food infection, carried mainly by food of animal origin. It is considered an invasive serovar, capable of causing serious diseases in humans. The aim of this study was to analyze 14 strains of *S. Heidelberg*, 11 isolated from food (2011-2017) and three from humans (2014-2017), in order to determine the genetic variability, virulence and antimicrobial susceptibility. All the isolates came from the strains bank of the Setor de Enterobactérias of Fiocruz, RJ. The presence of nine virulence genes: *sefA*, *lpfA* and *agfA* (fimbria), *invA*, *hilA* and *sivH* (invasion), *avrA* and *sopE* (effector protein) and *spvC* (plasmid virulence) were evaluated by PCR; the antimicrobial susceptibility was determined by minimum inhibitory concentration (MIC) for the classes of major importance for human and veterinary use, as beta-lactams (ceftriaxone: subclass of cephalosporins of 3rd generation, meropenem: subclass of carbapenems) and polymyxin (colistin), and the genetic similarity was determined by the use of PFGE technique. All strains had at least six of the virulence genes, 10 (71.4%) presented seven genes and one strain (7.4%) isolated from human faeces, presented all genes. The frequency found for each one was 100% (*avrA*, *invA*, *agfA* and *sivH*), 92.8% (*lpfA*, *sopE*, *hilA*) and 7.1% (*sefA*, *spvC*). The MIC results showed resistance of 50% (ceftriaxone), 35.7% (colistin) and none for meropenem. Four strains (28.6%), all from foods in SC and PR, presented concomitant resistance to ceftriaxone and colistin, and five (35.7%) were sensitive for all antimicrobials. Molecular typing demonstrated three clusters (similarity > 85%), grouping five strains, all from food, isolated in southern Brazil (PR, SC and RS), with similar virulence and antimicrobial susceptibility profiles. The other strains had distinct genetic profiles. The high frequency of the virulence genes demonstrates that the strains have high adhesion capacity, adaptation by cell signaling and invasion. Colistin resistance is worrying because it is a last generation drug, used in severe cases of the disease. The use of colistin as a growth promoter in animal production may have led to a selection pressure of resistant strains, which led to the ban on its use by MAPA in 2016, worried that the resistance could affect human health. In general, the results are alarming considering the high profiles of pathogenicity and resistance to colistin of the strains circulating in Brazil.

Keywords: MIC, pathogenicity, resistance, typing.

Development Agency: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG) e Fundação Oswaldo Cruz (FIOCRUZ)