

**TITLE:** AMPC B-LACTAMASE IN *Salmonella enterica* SEROVAR Heidelberg FROM POULTRY CARCASSES AND BROILERS FROM BRAZIL

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**ABSTRACT:**

AmpC  $\beta$ -lactamases are relevant enzymes produced by chromosomal or plasmid genes expressed by Gram negative bacteria, including Enterobacteriaceae family, that hydrolyze  $\beta$ -lactam antibiotics- cephalosporins, cephamycins, penicillins and combinations with  $\beta$ -lactamase inhibitors. Salmonellosis is a global disease of concern to health authorities and a major barrier to international trade in animal foods. Salmonellosis is a self-limiting gastroenteritis, but serious infections can occur in immunocompromised hosts and children requiring treatment. The objective of this study was to evaluate the phenotypic and genotypic profile of antimicrobial susceptibility regarding the AmpC  $\beta$ -lactamases mechanism of antimicrobial resistance of *Salmonella* Heidelberg (SH) from poultry carcasses and broilers from Brazil. From 2012 to 2017, 89 strains of SH were isolated at Poultry Health Laboratory in UFF and serotyped at Enterobacteria Laboratory in Oswaldo Cruz Foundation in Rio de Janeiro, Brazil, being 17 strains from broilers before slaughter and 72 from slaughterhouse carcasses under the Federal Inspection Service in Brazil. The antimicrobial susceptibility of the 89 strains was studied to 19 antimicrobial drugs by the disk diffusion test in according to CLSI guidelines. Third-generation cephalosporin (3GC) resistant strains of SH were screened by PCR for AmpC *bla*MOX-type, *bla*CIT-type, *bla*DHA-type, *bla*ACC-type, *bla*EBC-type and *bla*FOX-type genes. The highest frequencies to antimicrobial resistance of SH were to: sulfonamide 100% (n=89/89), ampicillin 88% (n=78/89), followed by amoxicillin/clavulanate, cephalexin, cephalothin, cefotaxime and tetracyclin all with 87% (n=77/89). Following, 6% (n= 5/89) of strains were resistant against cefepime (4th generation cephalosporin), 13% (n=12/89) against enrofloxacin and 8% (n=7/89) against ciprofloxacin. All strains were susceptible to chloramphenicol, imipenem, meropenem and ertapenem. A total of 77 SH that were 3GC resistant were screened for AmpC genes. In total, only five 3GC resistant strains were negative for all tested genes, 93,5% (n= 72/77) were *bla*CIT-type positive and 68,8% (n=53/77) were *bla*CMY-2 positive. The high rates of 3GC resistance in this study are worrisome, since they create great therapeutic limitations and are frequently associated with the presence of *bla*CMY-2 in *Salmonella* spp. since this enzyme has a stronger  $\beta$ -lactamase activity and the AmpC  $\beta$ -lactamases are distributed throughout the world.

**Keywords:** *Salmonella* Heidelberg, AmpC  $\beta$ -lactamases, poultry, third-generation cephalosporin

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