

Antimicrobial Resistance (AMR) and Antimicrobial Use (AMU) Study on Small and Medium Scale Broiler Farms in Subang District, West Java Province, Indonesia



Directorate General of Livestock and Animal Health Services
Ministry of Agriculture



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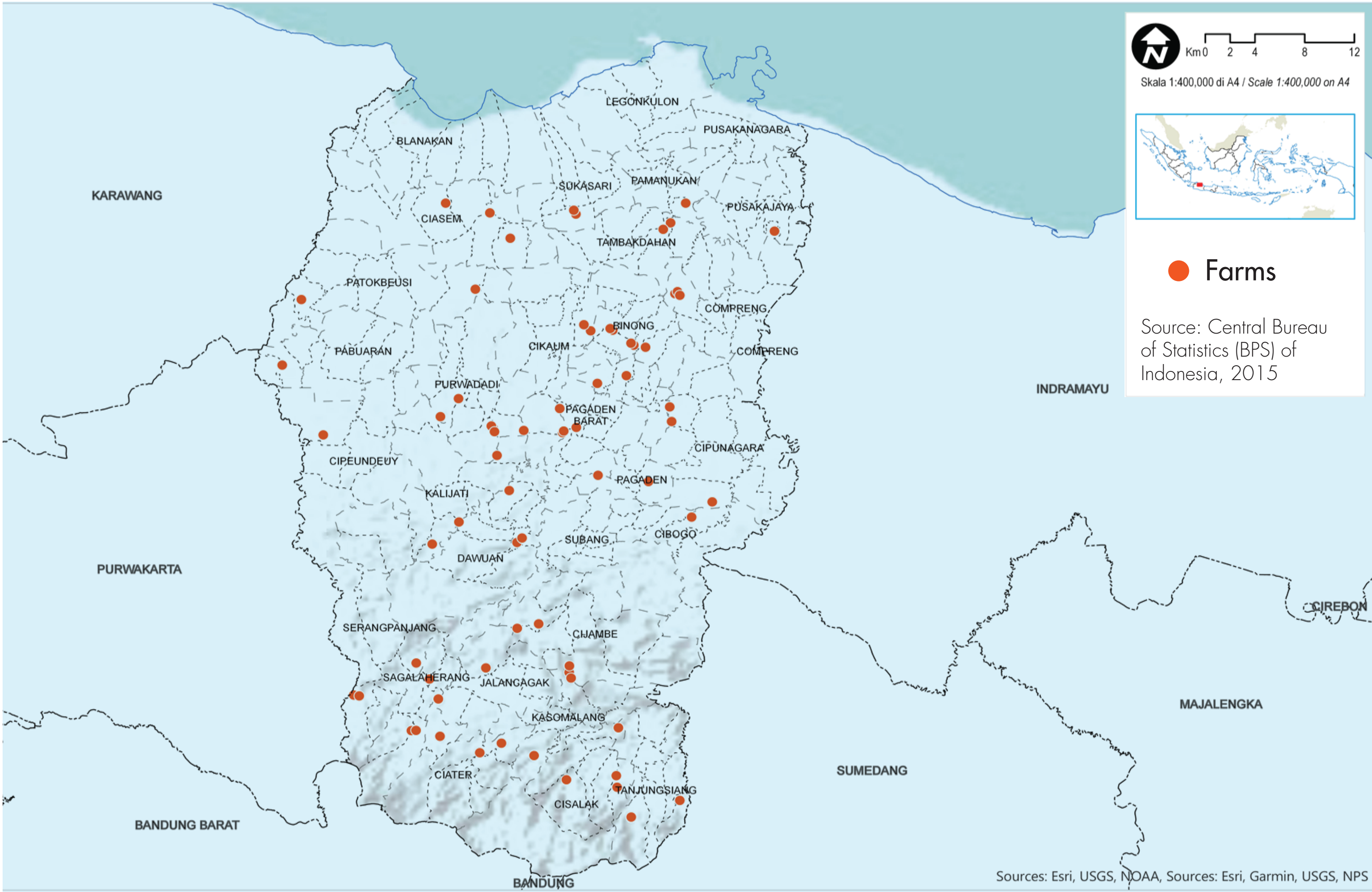
INTRODUCTION

The demand for animal-source food continues to increase and has encouraged farmers to use antibiotics as a growth promotor and prophylactic treatment, in addition to therapeutic uses. This can cause misuse of antibiotics at the farm level. The inappropriate use of antibiotics promotes antimicrobial resistance (AMR) in bacteria found in the broiler digestive tract and possibly in the farm environment. This study aimed to determine the prevalence of AMR in broiler farms related to *Salmonella* spp. and *E. coli* found in the digestive tract of broiler chickens and to assess antimicrobial use (AMU) on those farms.

MATERIALS AND METHODS

- A cross-sectional AMR-AMU study was conducted on 74 broiler farms in Subang District using a farm questionnaire, while antibiotic susceptibility testing (AST) was performed on the recovered *E. coli* and *Salmonella* spp isolates
- Boot swab samples were collected for laboratory isolation of *Salmonella* spp. and *E. coli*
- Samples were also taken from 5 pooled caecal specimens for *Salmonella* spp isolation and identification (FSIS, 2014).

Map of Farm Distribution - Subang District, 2018



Isolation and Identification

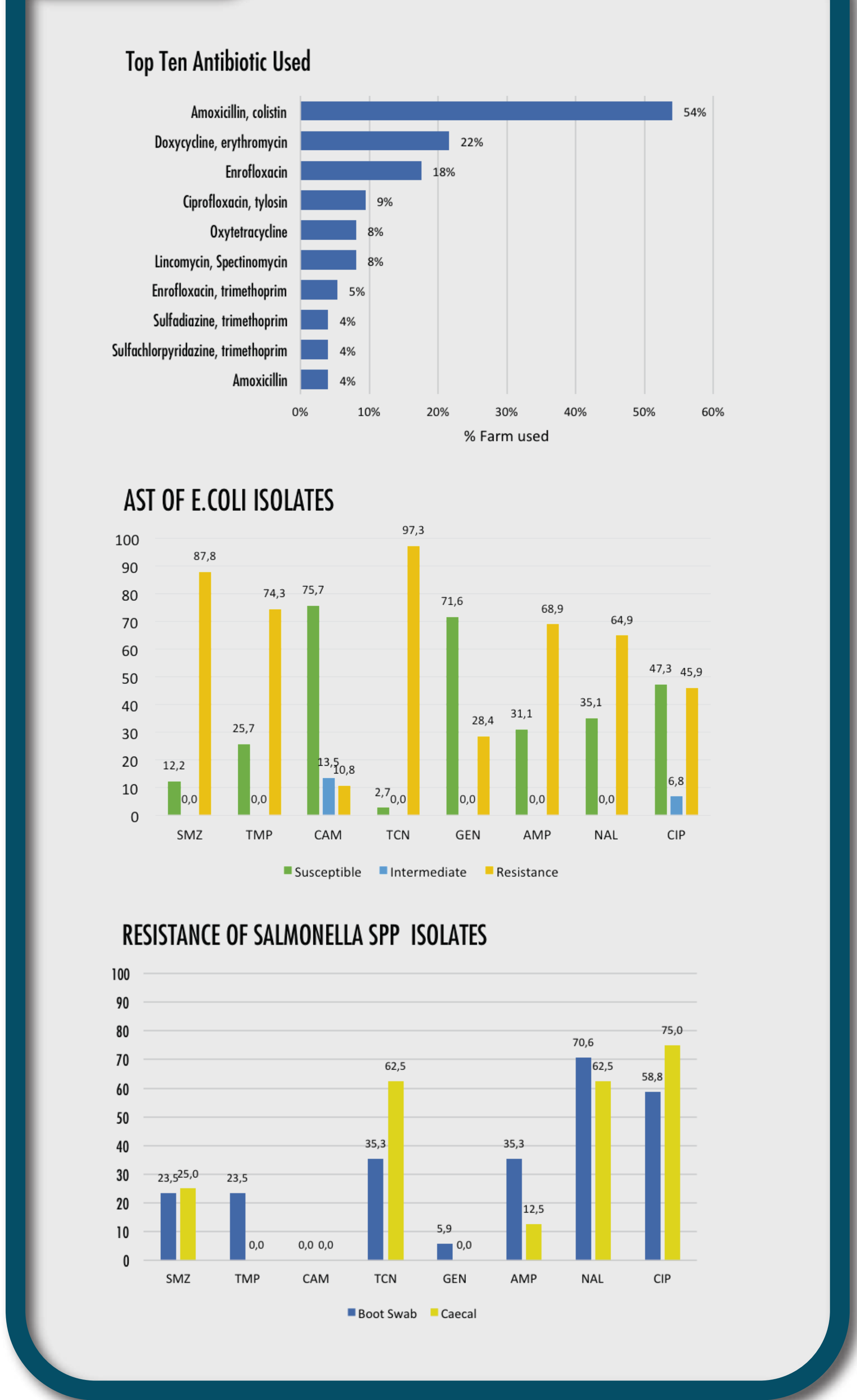
Isolation of *E.Coli* followed the protocol of Abdi-Hachesoo et al. (2017) and isolation of *Salmonella* spp followed the protocol of Kishima (2014), while serovars identification for *Salmonella* spp used an agglutination assay following the White-Kauffmann-Le Minor scheme (2007).



Antimicrobial Susceptibility Test (AST)

- AST was conducted for 74 isolates of *E. coli* and 17 isolates of *Salmonella* spp. from broiler house floors and 8 *Salmonella* spp. from broilers' caeca. Isolates were tested against eight antibiotics: Sulfamethoxazole (SMZ), Trimethoprim(TMP), Chloramphenicol (CAM), Tetracycline (TCN), Gentamicin (GEN), Ampicillin (AMP), Nalidixic acid (NAL), and Ciprofloxacin (CIP).
- AST was performed following CLSI VET01S (2015) and CLSI M100 (2018).
- Calculation of the percentage resistance was based on CLSI clinical breakpoints using the agar dilution method.

RESULTS



DISCUSSION

- *E. coli* were resistant to tetracycline (97%), sulfamethoxazole (88%), trimethoprim (74%), ampicillin (69%), nalidixic acid (64.8%), ciprofloxacin (46%), and gentamicin (28%).
- *Salmonella* isolates from broiler farm floors were resistant to nalidixic acid (71%), ciprofloxacin (59%), tetracycline and ampicillin (35%), and trimethoprim and sulfamethoxazole (23%);
- *Salmonella* isolates from broilers' caeca were resistant to ciprofloxacin (75%), nalidixic acid and tetracycline (62%), and sulfamethoxazole (25%).
- The most commonly used antibiotics were Amoxicillin-clavulanate (54%), Doxycycline-erythromycin (22%), enrofloxacin (18%), Ciprofloxacin-tylosin (9%), oxytetracycline (8%), Lincomycin-spectinomycin (8%), and Enrofloxacin, trimethoprim (5%)

CONCLUSIONS

- The on-farm isolated *E. Coli* were resistant against the main antibiotics used on broiler farms, mainly the Tetracycline, Penicillin and Quinolones groups; while *Salmonella* spp were mainly resistant to the Quinolones group.
- There were slight differences between the antibiotic resistance of *Salmonella* isolated from boot swabs and caeca, but that may not be significant given the small number of isolates tested.
- This study found 11 *Salmonella* serotypes in the digestive tract and environment of broiler chickens, of which 8 can infect humans (zoonoses).

RECOMMENDATIONS

- The results of this study provide important information for the control of AMU on farms, the development of AMR, especially against clinically and highly important antimicrobials for human use, and for the reinforcement of biosecurity on broiler farms to reduce the presence of *Salmonella* spp.
- Conduct a broader AMU survey to investigate the relationship between on-farm AMU patterns and the occurrence of AMR in broiler chickens.

Acknowledgements

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