A REPORT ON ANTIBIOTIC RESISTANCE OF *Eschericia coli* ISOLATED FROM VETERINARY SAMPLES IN MALAYSIA FROM 2010 TO 2013

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ABSTRACT

Antibiotics are important in the livestock industry for controlling bacterialinfections and as growth promoters. However, widespread antibiotic use is a major concern as it contributes to the emergence and spread of antibiotic-resistant bacteria. Antibiotic resistance testing of *Escherichia coli* isolated from avian and porcine samples from 2010 to 2013 showed high resistance levels to amoxicillin (92.9%), tilmicosin (92.7%), amoxicillin/clavulanic acid (87.9%) and trimethoprim sulfamethoxazole (82.7%). Prudent use of these antibiotics is highly recommended to control the spread of antibiotic-resistant bacteria in livestock.

INTRODUCTION

Antibiotics are widely used in veterinary and human medicine for therapy and control of bacterial infections. Antibiotics may be continuously administered to commercial livestock such as poultry and pigs as antimicrobial growth promoters; leading to enhanced selection of resistant bacteria in livestock (van den Bogaard *et al*. 2001) which may subsequently contribute to antibiotic resistance in human acquired through the human food chain (Sayah *et al.* 2005). Hence, antibiotic usage is considered the most important factor for the emergence, selection and dissemination of antibiotic-resistant bacteria (Sayah *et al.* 2005). As such, it is important for livestock producers to pick the correct antibiotics and the correct dosage for treatment in order to limit the incidence of antibiotic-resistant bacteria especially multi-resistant bacteria or "superbugs". This study was conducted to evaluate the resistance of *Escherichia coli* isolated from local commercial livestock in 2010-2013 to ten different antibiotics.

MATERIALS AND METHODS

Samples submitted to Vet Food Agro Diagnostics (M) Sdn Bhd from 2010 to 2013 were analysed for *E. coli* via microbiological methods using selective media such as MacConkey agar and Chromocult Coliform Agar (Merck). Sample types include organs, urine and swabs from avian and porcine sources. The isolated *E. coli* were subsequently tested for antibiotic resistance using Kirby-Bauer agar diffusion method. The ten antibiotics evaluated in this study are amoxicillin, amoxicillin/clavulanic acid, ciprofloxacin, enrofloxacin, norfloxacin, colistin, florfenicol, fosfomycin, tilmicosin and trimethoprim sulfamethoxazole.

RESULTS AND DISCUSSION

Table 1: Antibiotic resistance of *E. coli* isolated from avian and porcine sources in 2010-2013

Antibiotic	No. (%) of resistant strains	Total tested
Amoxicillin (10 µg and 25 µg)	130 (92.9%)	**140**
Amoxicillin/clavulanic acid (20/10 µg)	29 (87.9%)	**33**
Ciprofloxacin (5 µg)	2 (25.0%)	**8**
Enrofloxacin (5 µg)	40 (43.0%)	**93**
Norfloxacin (10 µg)	11 (31.4%)	**35**
Colistin (10 µg and 50 µg)	3 (2.1%)	**142**
Florfenicol (30 µg)	20 (54.1%)	**37**
Fosfomycin (50 µg and 200 µg)	23 (33.8%)	**53**
Tilmicosin (15 µg)	51 (92.7%)	**55**
Trimethoprim sulfamethoxazole (1.25+23.75 µg)	67 (82.7%)	**81**

The ten antibiotics chosen for this study i.e. from quinolones to sulpha and penicillin groups are widely used in Malaysian farms as the first line treatment. Of the ten antibiotics tested, high resistance levels were detected for amoxicillin (92.9%), tilmicosin (92.7%), amoxicillin/clavulanic acid (87.9%) and trimethoprim sulfamethoxazole (82.7%), which may be due to widespread misuse of antibiotics in livestock. The results show moderate resistance to quinolones such as ciprofloxacin, enrofloxacin and norfloxacin which ranges from 25.0-43.0%; probably due to more prudent use or possible switching to newer antibiotics such as fosfomycin and tilmicosin as an alternative treatment. In contrast, only 2.1% are resistant to colistin as colistin acts locally in the gastrointestinal tract only and is not absorbed into the body.

In vitro antibiotic resistance testing is an important tool to provide guidance to veterinarians in the choice of suitable antibiotic treatment. These antibiotics must be used prudently as they may cause cross-resistance with human enteric pathogens and further contribute to the spread of antibiotic-resistant bacteria (Blanco *et al*. 1997).

REFERENCES

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