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tion of the druggability of each of the identified proteins by the DrugBank database is under study. Results from this study could facilitate selection of *S.* Typhimurium proteins for entry into drug design and vaccine production pipelines.

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1.21.

Mutant prevention concentration and genetic mechanism of resistnace to fluoroquinolone in clinical isolates and *in vitro*-derived mutants of *Salmonella enteria serovar* Typhimurium from pig

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INTRODUCTION

Salmonella enterica (*S. enterica*) is a ubiquitous pathogen that infects both animals and humans. Fluoroquinolones (FQs) have been used for the treatment against *Salmonella* infection but therapeutic failure currently emerges due to bacterial resistance. The resistance breakpoint ciprofloxacin is MIC 4 mg l^{-1} (the high-level FQ resistance) but remains rare among clinical *Salmonella* isolates worldwide while the decreased susceptibility (MICs 0.12–1 mg 1^{-1}) phenotype is now prevalent worldwide. Therefore, it is important to monitor and understand of the low-level FQ resistants to prevent poor treatment outcomes for infection. In this study, we investigated the resistance to FQs of *S.* Typhimurium isolates of pig origin by determination of the mutant prevention concentrations (MPCs) and underlying mechanisms of selected mutant.

METHODS AND MATERIALS

29 strains of *S.* Typhimurium provided from Gyeongsangbuk-do Veterinary Service Laboratory were used in this study. The MICs of marbofloxacin were determined in the presence/absence of efflux pump inhibitor (PAβN) by a broth microdilution method (CLSI 2013 guidelines). The MPC values were determined for 15 isolates and ATCC14028 using agar plates containing drug (1–16 × MIC) for 72 h incubation. In addition, single-step mutants were selected from plate containing the highest concentration below MPC. Amino acid substitutions in the quinolone resistance determining regions (QRDRs) were further analyzed.

RESULTS AND CONCLUSION

The MICs of marbofloxacin for *S.* Typhimurium isolates ranged from 0.03 to 1 mg l^{-1} (MIC_{50} 0.25 mg l^{-1} and MIC_{90} 1 mg l^{-1}). For 16 isolates, the MPCs of marbofloxacin were ranged 0.13–5 mg l^{-1}, showing the range of 2.5–8 of MPC/MIC ratios. Higher MPC values (5 mg l^{-1}) were observed only in two isolates. The MIC change between parent and one-step mutants was shown in the range from 1 to 16-folds. The single mutations in only *gyrA* (D87Y, H or S83F) were exhibited in 9 parental isolates and 12 one-step mutants. Interestingly, one one-step mutant showed the double mutation in *gyrA* (D87H and S83F), while amino acid alterations in 3 one-step mutants was not found. MICs values were decreased (1–9 × MIC) after treatment with PAβN indicating resistance involved in an efflux pump. Given the possibility of development of FQs resistance, continuous monitoring of the emergence of resistant isolates and responsiveness of animals to FQs treatment would be required.

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1.22.

Fosfomycin residues in colostrum: Impact on morpho-physiology of suckling piglets

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INTRODUCTION/OBJECTIVE

Ingestion of colostrum containing antimicrobial residues can alter the proper development of piglet's intestine, causing morpho-physiological changes which would negatively impact on its future productive life. Irrational use of antibiotics can bring about imbalance on microbiota diversity causing diarrhea and even death. The aim of this study was to determine the effects of fosfomycin residues found in colostrum on intestinal morpho-physiology and microbiota of suckling piglets.

MATERIALS AND METHODS

Farrow was induced in 18 sows at 114 days of gestation. 9 received 15 mg kg^{-1} BW disodium fosfomycin (Fosbac®, Bedson S.A., Argentina) via IM; and 9 were used as control. Piglets were monitored during the first 24 h of life at maternity room (PPS, Pro Surveillence System®). Colostrum production and intake were calculated using the equation developed by Devillers *et all.* (2007). 8 piglets were selected at random from treated sows and divided into 2 groups: A: euthanasia was done after 12 h of lactation and B: euthanasia was done after 24 h of lactation. Likewise 8 piglets were selected from control sows and divided into groups C and D where euthanasia took place at 12 and 24 h respectively. Intestine samples were collected to determine bacteriology (CFU *Lactobacillus* and *Enterobacteria*) and histology (absorption surface area). For statistical analysis software PROC MIXED and GLM del SAS V9.3 was used.

RESULTS

Colostrum/milk production by the sows and its intake by the litter were 2921 and 294.2 mL accordingly. Fosfomycin average ingestion per piglet was 0.27 mg kg^{-1} BW. No significant interactions between *Enterobacteria* were observed for the different groups (($P > 0.05$). Bacterial count for *Lactobacillus* was greater at 24 h than at 12 h (7.55 ± 0.19 y 6.64 ± 0.3 respectively). No significant interactions between groups were detected by histological studies ($p > 0.05$). Measured absorption surface areas were between 10.30 and 6.30 μm^2 in all groups.

DISCUSSION AND CONCLUSIONS

Results show that ingestion of colostrum containing fosfomycin residues would not have an impact on intestinal microbiota balance of neonatal piglets. This can be explained by phisicochemical properties of this antibiotic and its low distribution to mammary fluids. Therefore fosfomycin can be considered to be safe for treatment of gestating sows during farrowing and lactation.

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1.23.

Characterization of antimicrobial use in animal production: medicated feed in swine

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INTRODUCTION/OBJECTIVE

The rapid emergence of bacterial resistance becomes crucial for the reduction and, especially, the prudent use of antibiotics in human and veterinary medicine. However, data on the use of antibiotics in livestock production, which are not currently available in Portugal, are needed in order to assess and confirm the appropriate practices in terms of animal husbandry and treatment of animals.

This study characterizes qualitatively and quantitatively the use of antibiotics through medicated feed produced in Portugal, which consists on 70% of total the antibiotic consumption at national livestock level.

MATERIALS AND METHODS

To meet the objectives three surveys had been send to medicated feed authorized manufacturers, either industrially or self-production mode, and to pig farms of the Lisbon and Tagus Valley region (LVT). The surveys were addressed to the veterinarians responsible for each establishment.

R® program was used to perform simple descriptive analysis and for inferential statistical analysis toestablished cause-effect relationships between variables.

RESULTS AND CONCLUSIONS

In 2012, Portugal produced 395 102 tonnes of medicated feed, with a total of 64.9 tonnes of antibiotic incorporated. The most commonly used classes of antibiotics were tetracycline (22.3 tonnes), followed by macrolides (9.5 tonnes) and β-lactams (8.0 tonnes).

Pig production is the sector that consumes more medicated feed in a total of 314 528 tones, followed by poultry, rabbits and cattle farming. In 2012, the pig industry, essentially used tetracyclines (10.5 tonnes), macrolides (5.7 tonnes) and pleuromutilins (3.8 tonnes). The comsuption of these substances in medicated feed was more important in rearing and fattening phases with 7010 and 8723 kg, respectively.

Pig farming follows the reduction of antibiotic use because in 2012 the amount of antibiotics in medicated feed by the average number of animals was 155 kg against 173 kg in 2010, representing a decrease of 10.4% in the use of these substances.

KEY-WORDS

medicated feed, antibiotics, pig production, prudent use, reducing.

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ABSTRACT DELETED