



Ionophores and Clostridium perfringens

Objective

To give an overview of the susceptibility of *Clostridium perfringens* isolates from clinical cases (broilers) to ionophores and correlate this with the concentration of ionophores in the intestinal tract.

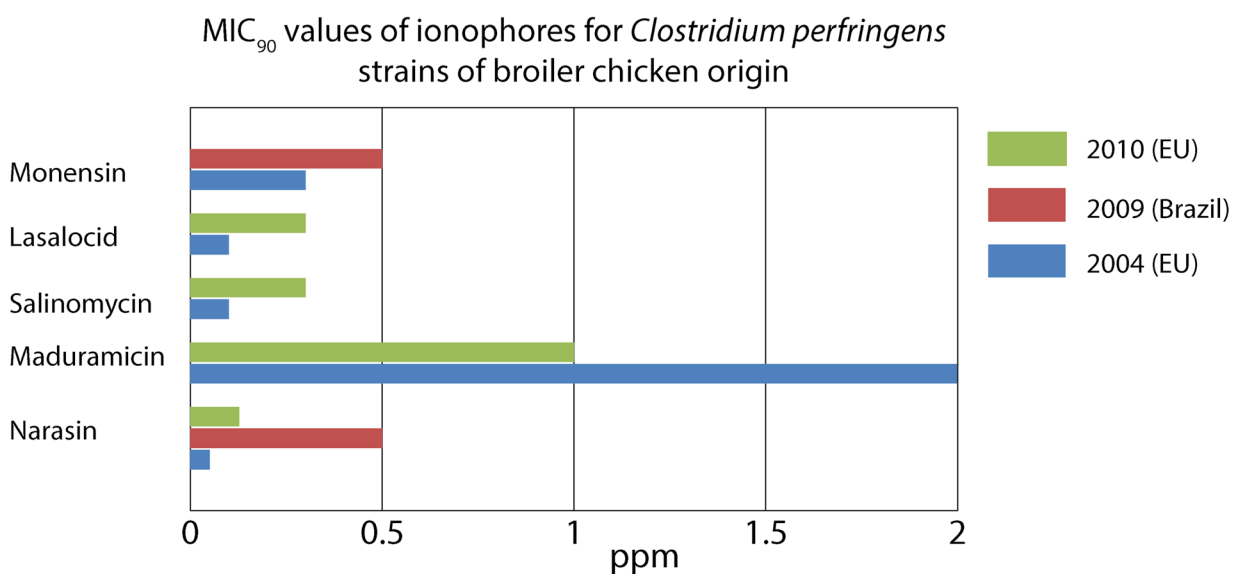
Description of the test

The susceptibility of different *C. perfringens* isolates to ionophores was evaluated and the Minimum Inhibitory Concentration (MIC₉₀) was determined. The MIC₉₀ is the lowest concentration of the tested compound that will inhibit the visible growth of 90% of the tested *C. perfringens* population.

In Graph 1 the MIC₉₀ values of the different ionophores determined in three different studies are summarized. The bacterial strains were isolated from clinical cases (in broilers) originating from different countries: Martel *et al.*, 2004 (44 strains, European origin), Silva *et al.*, 2009 (55 strains, Brazilian origin), Lanckriet *et al.*, 2010 (51 strains, European origin).

Result

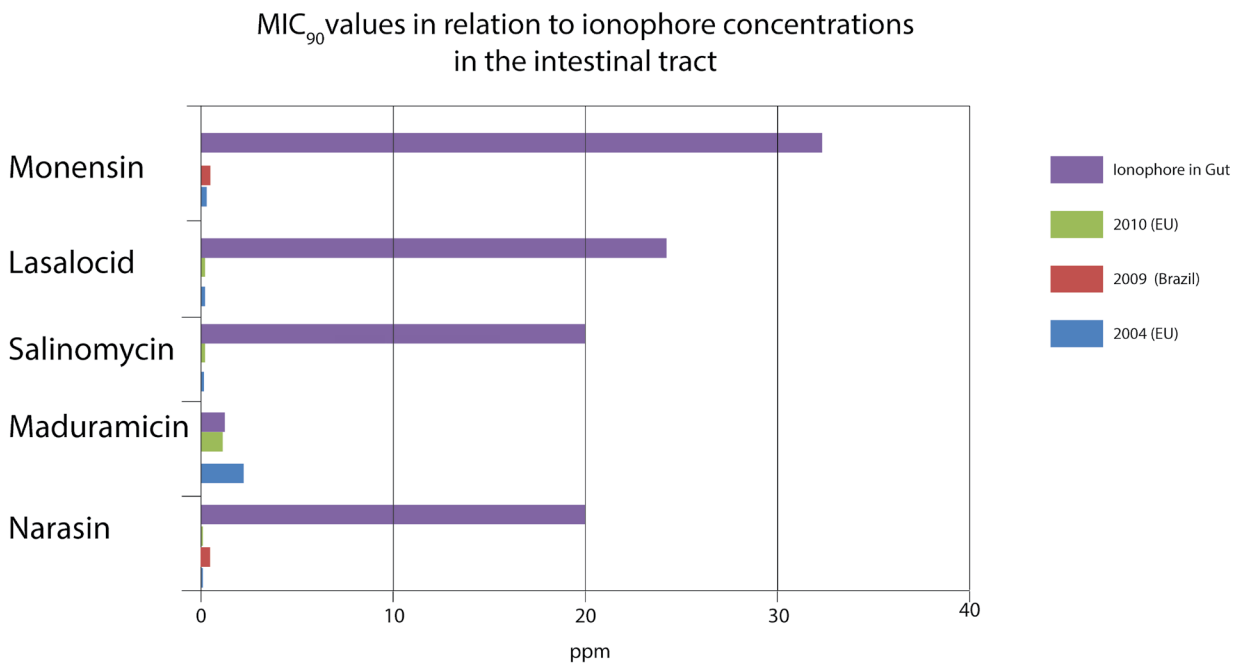
Graph 1:



Graph 1: MIC₉₀ values of all ionophores for the evaluated *C. perfringens* population

In Graph 2, the MIC₉₀ values are presented in relation to the estimated concentration of the different ionophores in the intestinal tract. MIC₉₀ values are expressed in µg/ml which correlates to ppm. The concentration of an ionophore in the intestinal tract was estimated based on the lowest registered dosage of each additive and taking into account dilution in the intestinal tract by water consumption (water/feed ratio of 2)

Graph 2:



Graph 2: MIC₉₀ values for all ionophores in relation to their estimated concentration in the intestinal tract

Conclusion

In spite of small differences in the MIC₉₀ values between the different ionophores, the ionophore concentration in the intestinal tract is multiple times higher than the MIC₉₀ for *Clostridium perfringens* for all ionophores (except for maduramicin). Therefore, discussions on differences in MIC values between ionophores are irrelevant. Since coccidiosis is one of the most important predisposing factors for *Clostridium* problems, the intended activity of the ionophores, their anticoccidial activity is a more important determinant of the occurrence of necrotic enteritis or dysbacteriosis.

References

Susceptibility of *Clostridium perfringens* strains from broiler chickens to antibiotics and anticoccidials A. Martel, L. A. Devriese, K. Cauwerts, K. De Gussem, A. Decostere and F. Haesebrouck; Avian Pathology, 2004, 33(1), 3-7

The effect of commonly used anticoccidials and antibiotics in a subclinical necrotic enteritis model A. Lanckriet, L. Timbermont, M. De Gussem, M. Marien, D. Vancraeynest, F. Haesebrouck, R. Ducatelle, F. Van Immerseel and Avian Pathology, 2010, 39(1), 63-68

Antimicrobial susceptibility of *Clostridium perfringens* strains isolated from broiler chickens R. Silva, F. Salvarani, R. Assis, N. Martins, P. Pires, F. Lobato, Brazilian Journal of Microbiology, 2009, 40