

Effects of Aureo S 700® and Aureomycin® in Reducing Lung Lesions in *Haemophilus somnus*-Challenged Calves

Introduction

A study was conducted at Iowa State University to evaluate the efficacy of Aureo S 700 (chlortetracycline and sulfamethazine) and Aureomycin (chlortetracycline) in the feed in reducing lung lesions in calves challenged with a pathogenic strain of *Haemophilus somnus*.

Experimental Design

Holstein calves were randomly assigned to treatments in each of two studies. Four calves were individually fed each treatment in study 1; whereas, in study 2 four calves were assigned to each treatment with the exception of Aureomycin, where 8 calves were included. Treatments consisted of the following:

- uninfected, unmedicated controls (UUC);
- infected, unmedicated controls (IUC);
- Aureo S 700 (350 mg chlortetracycline and 350 mg sulfamethazine per head daily);
- Aureomycin (350 mg chlortetracycline per head daily).

Calves received medicated feed for three days before and seven days after intratracheal challenge with *H. somnus*. Calves were euthanized on the eighth day after *H. somnus* challenge. Clinical observations included body temperatures, amounts of feed and medications consumed, and animal depression indices. Complete bacteriological profiles, gross and histopathological examination, virology, and lung lesion measurements were performed on all calves. Blood and lung tissue levels represent the average of two assay replicates per calf.

Results

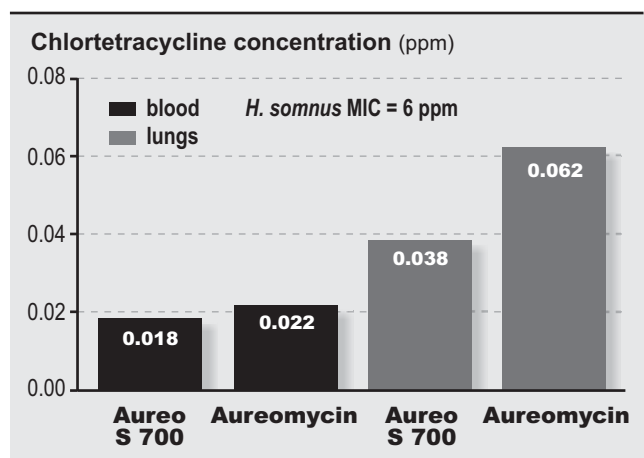
Blood and Lung Tissue Concentrations of Aureomycin

Lung levels of Aureomycin were substantially higher than blood levels in both antibacterial treatments (Figure 1). Attaining high levels in target organs is a desirable effect needed to control and/or treat disease problems. In addition, average blood and lung tissue levels of sulfamethazine were 0.50 and 0.31 ppm, respectively.

Comparison of Blood and Lung Levels to MIC

The MIC for Aureomycin vs the *H. somnus* strain used in the study was found to be 6 ppm ($\mu\text{g/mL}$); considerably higher than the blood and lung levels achieved in treatment groups (Figure 1). Sulfamethazine concentrations in blood and lung tissue were also lower than the MIC for sulfamethazine vs this *H. somnus* strain. While Aureo S 700 and Aureomycin concentrations were below in vitro MIC, reductions in the severity of *H. somnus* lung lesions were noted.

FIGURE 1: Aureomycin blood and lung tissue levels compared with MIC.



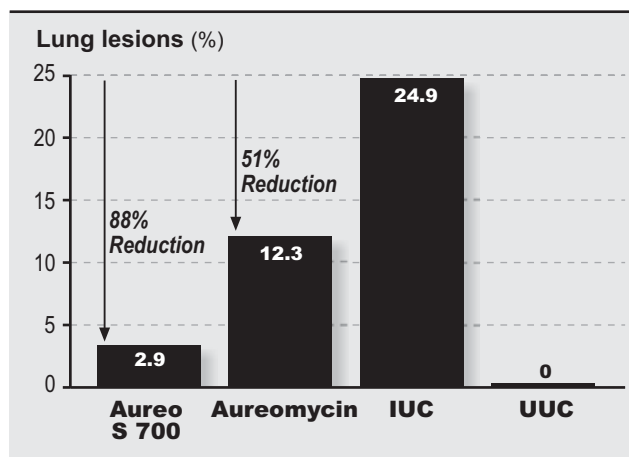
Effect of Aureo S 700 and Aureomycin on *H. somnus* Lung Lesions

Feeding Aureomycin to provide 350 mg of chlortetracycline per head per day three days before and seven days after challenge with a pathogenic *H. somnus* strain reduced development of *H. somnus* lung lesions by 51% compared with IUC (Figure 2). However, feeding Aureo S 700 reduced lung lesions by an additional 76% compared with Aureomycin and 88% compared with IUC.

Implications

In this study, sub-MIC levels of Aureo S 700 and Aureomycin dramatically reduced the severity of *H. somnus* lung lesions, *in vivo*. The most efficacious reduction in lung lesions occurs when Aureo S 700 is fed combining the effects of chlortetracycline and sulfamethazine.

FIGURE 2: Effect of Aureo S 700 and Aureomycin on *H. somnus* lung lesions.



Literature Cited

J. Andrews, D.V.M., Ph.D., Veterinary Medical Research Institute, College of Veterinary Medicine, Iowa State University, Ames, Iowa, and T.E. Lucas, D.V.M., M.S., American Cyanamid, 1991.