



## Improving Cattle Welfare: A Meloxicam Tissue Residue Study

The AABP Foundation supports a variety of projects that enhance bovine veterinary medicine. One such project that will have an impact on how veterinarians practice was a tissue residue study that evaluated the depletion of meloxicam from bovine tissue following oral administration of 0.5 mg/kg once daily for four days. This research was conducted by Hans Coetzee, BVSc, PhD, Cert. CHP, Dipl. ACVCP, Dipl. ACAW, Iowa State University. The AABP Foundation granted \$8,500 for this important research.

“It was suggested to us that the AABP Foundation may support work that was of importance to practitioners but was unlikely to qualify for funding by any other mechanism,” says Coetzee.

Issues related to the wellbeing of livestock are becoming increasingly important to consumers, with concerns being raised about painful procedures performed without the use of analgesia, explains Coetzee. “There are currently no analgesic drugs specifically approved by the FDA for the alleviation of pain in livestock in the United States. Our group had demonstrated that the bioavailability of oral meloxicam tablets is 100% (range, 64% to 166%) and the half-life is 27 hours. Further studies indicated that oral meloxicam provided effective, long-lasting analgesia in ruminant cattle. Meloxicam tablets also cost less than \$0.10 to medicate 100 lbs. bodyweight which made them an economically attractive analgesic option for routine use.”

Coetzee says in the United States, meloxicam administration to cattle by any route constitutes extra-label drug use (ELDU). ELDU is not permitted if it results in a violative food residue. “FARAD had indicated that they were concerned about the risk of tissue residues associated with meloxicam use because no meloxicam residue depletion studies were available in the published literature,” Coetzee says. “We had just completed a study in which we administered 0.5 mg/kg meloxicam orally once daily for four days to 13, 8-month-old lame, crossbred beef steers weighing between 286 and 392 kg. The plasma pharmacokinetics of meloxicam and drug effect was determined in each animal over 144 hours after first administration.”

Coetzee says cohorts of three calves were then randomly assigned to be euthanized at five, 10 and 15 days after final drug administration. The remaining four calves were euthanized at 19 days after final administration. Samples of muscle, liver kidney and fat were harvested from each slaughtered animal at each time point and stored at  $-30^{\circ}\text{C}$ .

“Funding was sought from the AABP Foundation to develop an extraction and analytical method to determine tissue meloxicam concentrations by liquid chromatography-mass spectroscopy (LC-MS),” Coetzee adds. “The results of this study assisted FARAD in estimating a meat withdrawal time for meloxicam in ruminant calves. Our findings suggest that a 21-day meat withhold period would be appropriate following a single oral administration of meloxicam to ruminant calves. This research will benefit bovine practitioners by allowing them to safely use prescribe meloxicam in an extra-label manner for the alleviation of pain in cattle.”

Coetzee says the study is in the final stages of preparation for publication in the *Journal of Veterinary Pharmacology and Therapeutics* before the end of this year.

### **Why this was critical research**

“This funding was critical because it allowed us to conduct research that was of benefit for bovine practitioners, but as I mentioned before, was unlikely to be supported by any other funding mechanism,” Coetzee notes. “Under AMDUCA, meloxicam can legally be used to alleviate pain in cattle; however, it is the veterinarian’s responsibility to ensure that such use did not result in a violative tissue residue in the animals. By funding a tissue residue study with meloxicam, the AABP foundation was instrumental in generating data that allows veterinarians to provide effective and economical analgesia to calves for several days after dehorning and castration and also remaining in compliance with AMDUCA. This allows the profession to proactively address consumer concerns about animal welfare while also ensuring that food animal products are free from violative drug residues.”

Coetzee adds that AABP Foundation funds are an invaluable resource to researchers seeking funding for projects that address current and relevant issues to bovine practitioners and livestock producers but that might not otherwise be funded. “As such researcher groups like ours will definitely be seeking funds in the future to support projects that we are confident will benefit AABP members and the livestock industry.”

Find out more about the AABP Foundation at <http://foundation.aabp.org/>.