



Comparing the Efficacy of Copper Oxide Wire Particles and Copper Sulfate on *Haemonchus contortus* in Goats

by James Mackey, Murray State University

Background

Haemonchus contortus (the barber pole worm) is a primary concern for goat producers. It thrives in warm temperate zones like the Southeastern region of the United States. An infestation of *H. contortus*, known as haemonchosis, can cause poor development, poor performance, and death which makes *H. contortus* one of the most economically impactful parasites in goats. Commercial anthelmintics have been used to control *H. contortus*, but overuse of these products has led to the development of anthelmintic resistance in this parasite. Consequently, alternative ways to monitor and control it have been researched. While rotating between the different classes of anthelmintics has helped to slow *H. contortus*' resistance development, even this method alone has not worked to prevent resistance from developing. Methods such as the Faffa Malan Chart (FAMACHA) system and fecal egg counts (FEC) have been developed to monitor this parasite and to reduce its rate of development of resistance. The FAMACHA system and FEC are used to selectively treat only the goats with significant infestations to allow for the *H. contortus* gene pool to develop variability. Alternative treatments to chemical anthelmintics are copper oxide wire particles (COWP) and copper sulfate (CuSO_4). These have been found to be effective at controlling *H. contortus* populations in goats with a lessened

resistance development and are beginning to be used alongside chemical anthelmintics to combat resistance development in *H. contortus*. Both COWP and CuSO_4 have been individually compared to, and used alongside, chemical anthelmintics in some studies. However, as of this writing, the researchers were unable to find a study that compared the effectiveness of COWP to CuSO_4 in a comparative study.

Research Method

The researchers performed a comparative study between COWP, CuSO_4 , and Levamisole. The study utilized a group of 60 female goats that were randomly divided into 3 groups while maintaining a similar average age between the 3 groups. Each goat in group 1 received a 4g COWP bolus. Group 2 received CuSO_4 drench by weight, and group 3 received a levamisole drench by weight. Fecal egg counts were performed on each goat every 2 weeks for 14 weeks. Body condition scores and FAMACHA scores were obtained on each goat every 2 weeks for 14 weeks, and packed cell volumes were performed every 4 weeks for 14 weeks.

Results

Overall, this measured the efficiency of the 3 methods of deworming. Both COWP and Levamisole were reliably effective at managing the *H. contortus* population. The CuSO_4 was only mildly effective and required repeated dosing to prevent anemia in the group. (Figure 1) The CuSO_4 group also had

larger standard deviations overall than both the COWP and levamisole groups, meaning that the treatment was less consistent. The results showed that COWP are an effective way of controlling *H. contortus* in goats as it produced similar results to the Levamisole control group. (Figure 2, 3) CuSO_4 was not a reliable method of controlling *H. contortus* populations. The CuSO_4 group was not only less effective at treating the *H. contortus* infestations, but the dosage (60mL for goats over #100) was more difficult to give than administering a single COWP bolus. While COWP and CuSO_4 have been found to be an alternative to chemical anthelmintics and can be used alongside chemical anthelmintics to reduce resistance development, COWP should be selected over CuSO_4 .

James Mackey is a student at Murray State University, where he is currently obtaining a Bachelor's of Science in Agriculture. Passionate about animals, he is pursuing a career as a veterinarian. When he is not busy with academia, he enjoys volunteering at his local animal shelter.

Special Thanks To:

- The Kentucky Sheep and Goat Council (KY Check-Off) for funding the research project
- Darien Maness, Nicole Hodge, and Victoria Shutz for helping throughout the study with collections, transportation, and lab work

Figure 1.) COWP group's PCV's were relatively stable through entire study; whereas, CuSO4 and Levamisole groups had to be retreated around week 4 of the study.

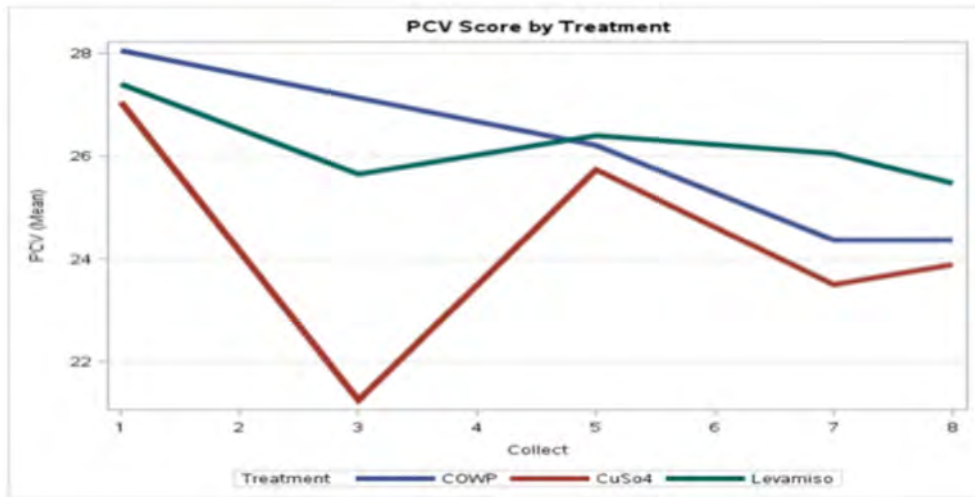


Figure 2.) CuSO4 group maintained a fairly high average FAMACHA score whereas, the COWP and Levamisole FAMACHA scores were similar.

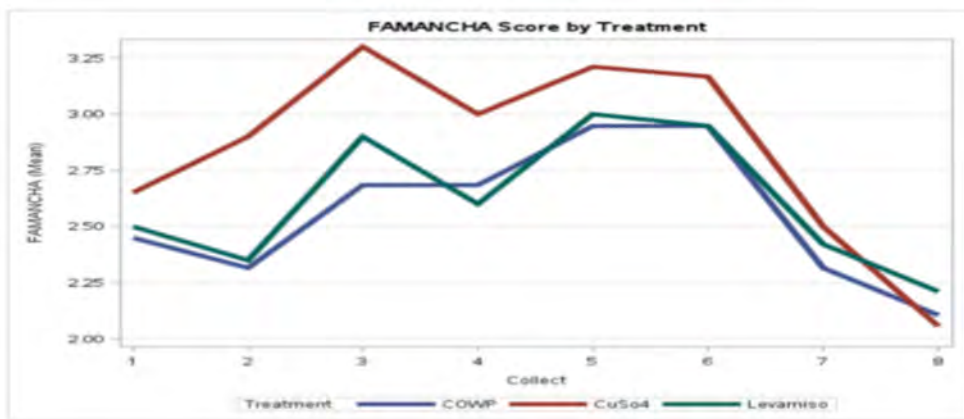
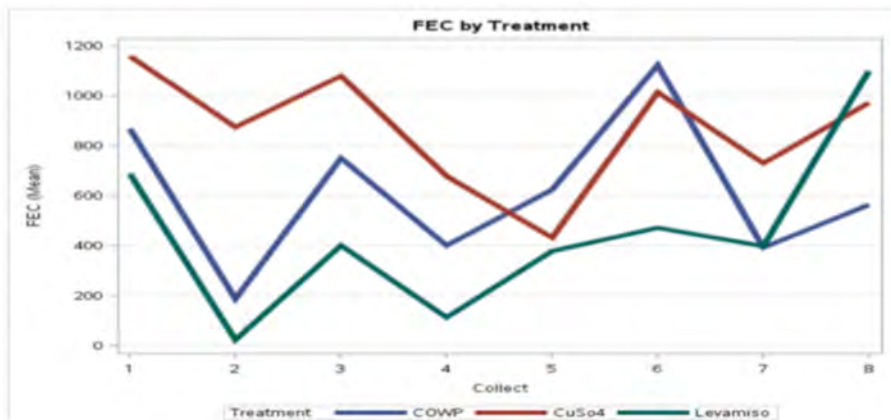



Figure 3.) Illustrates that the CuSO4 group's FEC dropped significantly after being redosed as did the Levamisole group but they went back up at next collection. The average FEC for the COWP and Levamisole group were lower over the entire study when compared to the CuSO4 group.




- Dr. Beth Johnson and Dr. William DeWees for helping set the framework and providing guidance throughout the project.
- Dr. Alyx Shultz for helping with the initiation of the study and running the statistical analysis
- Barbie Papajeski for providing guidance with the laboratory procedures and verifying all the fecal egg count results.
- Shawn and Ginny Harper and their help with managing the goats

MADE IN USA




**NO-BULL
ENTERPRISES**

CALLICRATE
**WEE
BANDER™**




EARLY CASTRATION

- **HUMANE**
- **BLOODLESS**
- **DRUG FREE**





CALLICRATE
**PRO
BANDER™**



DELAYED CASTRATION

- **HORN REMOVAL**
- **TREAT PROLAPSES**





CallicrateBanders.com