

AASRP Research Summaries

Comparing the efficacy of copper oxide wire particles, copper sulfate and levamisole on *Haemonchus contortus* in goats

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Introduction

Haemonchus contortus is a primary concern for goat producers. An infestation of *H. contortus*, known as haemonchosis, can cause poor development, poor performance, and death. Due to the development of anthelmintic resistance, alternative ways to monitor and control haemonchus have been researched. Alternatives treatments to chemical anthelmintics are copper oxide wire particles (COWP) and copper sulfate (CuSO₄). 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*. This study was performed to compare the effectiveness of COWP vs CuSO₄ vs Levamisole.

Materials and Methods

A group of 60 mature does were randomly separated into 3 groups of 20.

A DrenchRite[®] test was performed on the collective fecal samples from each of the 3 groups. The *H. contortus* present in each of the 3 groups showed resistance to Benzimidazole, Levamisole, Moxidectin, and Ivermectin. Based on the results of the DrenchRite[®] tests, Levamisole was chosen as the anthelmintic for group III.

Group I: Copper Oxide Wire Particles (COWP): The does each received a 4g bolus of COWP.

Group II: Copper Sulfate (CuSO₄): The CuSO₄ was prepared by dissolving 2oz of CuSO₄ into 3 quarts of warm water. Does weighing between 61-80 lb received 50mL of the CuSO₄ drench, and does weighing over 80 lb received 60mL of the CuSO₄ drench. The CuSO₄ drench was re-dosed 6 weeks after the initial dosing due to high mean FEC and FAMACHA scores and low mean PCVs of the does in group II.

Group III: Levamisole: A 52g package of Prohibit (Levamisole) was dissolved into 1 quart of water, yielding a 49.6mg/mL solution. The levamisole was then dosed at 12mg/kg of body weight as a single oral drench. The levamisole was re-dosed 4 weeks after the initial dosing.

Fecal Egg Counts: Fecal egg counts (FEC) were performed on every goat at the initial dosing and at weeks

2,4,6,8,10,12, and 14. FECs were performed utilizing 2.00 grams of feces with 28mLs of a sucrose solution. The mixture was strained and refrigerated overnight. The following morning the mixture was then resuspended and placed on McMaster slides to be read by 3 different individuals and an average was taken.

PCV: Packed cell volumes (PCV) were performed on every goat at the initial dosing and at weeks 4, 8, 12, and 14.

FAMACHA: FAMACHA scores were obtained at the initial dosing and at weeks 2, 4, 6, 8, 10, 12, and 14. This score was used as a subjective measure of anemia. A FAMACHA score card was used to determine the FAMACHA score at each collection.

The data collected on the FEC, FAMACHA, and PCV was analyzed using SAS.

Results

There was no significant variance in treatments between breeds. There was a statistically significant difference between treatments on FEC: $P < 0.0001$. There was a statistically significant difference between treatments on FAMACHA: $P < 0.0001$. There was a statistically significant difference between treatments on PCV: $P < 0.0001$. The CuSO₄ group had larger standard deviations overall than both the COWP and levamisole groups, meaning that the treatment was less consistent. Both the COWP and levamisole groups had higher mean PCV, lower mean FEC and lower mean FAMACHA scores than the CuSO₄ group, despite redosing the CuSO₄ 6 weeks into the study.

Significance

COWP are an effective way of controlling *H. contortus* in goats as it produced similar results to the Levamisole control group. CuSO₄ was not a reliable way of controlling *H. contortus* populations. The CuSO₄ group had a much larger standard deviation than the COWP and levamisole groups and was less effective at treating the *H. contortus* infestations. While COWP and CuSO₄ have been found to be effective when used in combination with chemical anthelmintics, COWP should be selected over CuSO₄ for the reasons stated in this trial.