Effect of Berberine on Gregarine Infections of Tenebrio molitor: An Organic Alternative to Antibiotics for Protozoan Gut Infections

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Poultry producers spend 1.5 billion dollars annually on the treatment and prevention of coccidiosis (Sundar, 2017). Industrial changes, due to regulations of antibiotic usage by the FDA and consumer demand for non-medicated meats, have led producers to look for alternative methods to medication. Based on previous findings, berberine was believed to be a viable antibiotic alternative to sulfadimethoxine for gregarine infection in Tenebrio molitor. The effects of berberine at both 2.5% and 0.25% daily consumption supplemental values were tested against those of sulfadimethoxine for 15 days. Using DAPI staining protocols, the gut content of T. molitor was viewed with fluorescence microscopy to total the varying gregarine oocyst density. Specimens treated with 2.5% berberine had similar responses to those treated with sulfadimethoxine, with overlapping error signifying comparable efficacy. To identify the most effective concentration between 2.5% - 0.25% where berberine remained an inhibitor to gregarine production, samples were tested with an identical protocol to prior treatments. Concentrations?2% did not impede gregarine growth, and oocyst density increased. This experiment confirmed 2.5% berberine was effective at reducing the population of gregarines, and demonstrated decreasing effectiveness with decreasing concentration. Berberine has been identified as an anti-protozoan agent (Izawa, 2010), however, these results establish berberine’s properties as having a direct effect of lowerine gregarine levels in T. molitor.

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