

□ **Project Title:** Development of Novel Anthelmintics and Antiparasitics Derived from Plant Sources

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**Abstract**

Currently, only a few anthelmintic drugs are used to control or treat livestock and human gastrointestinal nematodes (GIN). These parasites cause massive livestock economic losses (APHIS, 2011) and morbidity in humans (Taye et al 2014). In livestock, continuous broadscale anthelmintic treatment causes rapid development of anthelmintic resistance. One option to combat resistance is the exploration of various plants with purposed experimental and anecdotal anthelmintic and antiparasitic activity. We propose a two stage study, incorporating both in vitro and in vivo trials of various plant extracts as anthelmintics. The in vitro study will test several phytochemicals' ability to evoke aversion or mortality in a model organism, *Caenorhabditis elegans* and the anthelmintic resistant GIN, *Haemonchus contortus* (a fatal ruminant helminth). We will employ a full factorial design using laboratory grade extracts when possible and our own laboratory extracts when needed. The in vivo study will develop a strategy for administration of plants and their extracts to goats and evaluate the anthelmintic activity based on fecal egg and adult counts. The results from this study will result in novel strategies for treating GIN in small ruminants. This will provide a solid research foundation for adaptation of strategies to determine efficacy of identical or similar plant products on GIN and other intestinal parasites in humans. This work easily translates to developing communities as a one health approach. Herd health transfers directly to human health via economic security, food security and community stability, not to mention the translation opportunity to human GIN anthelmintic resistance.