In vitro and in silico Evaluation of Embryogenesis Inhibition Activity of Ethanolic Extracts of Chico (Manilkara zapota) Bark Against Gastrointestinal Strongyle Eggs

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Strongyloides, a group of parasites identified in ruminants, had displayed a growing resistance against commercial anthelmintic treatments which has caused economic losses in livestock and agriculture especially in continents like Asia, Europe, and South America. This study aimed to evaluate the embryogenesis inhibition activity of ethanolic extracts of the tannin-rich chico (Manilkara zapota) bark against gastrointestinal strongyle eggs through an in vitro and in silico evaluation. For the in vitro evaluation, the chico bark extract at varying concentrations were prepared. Fecal samples identified with strongyle eggs underwent fecalysis and were subjected to the different treatments. The embryogenesis inhibition rate was calculated after data collection. In silico molecular docking of gallotannins, ellagitannins, and ivermectin-B1a with tubulin alpha-1b was conducted using AutoDock Vina and visualized in ChimeraX and PyMol. In vitro results showed that the higher the concentration of the chico bark, the higher the embryogenesis inhibition rate. Statistical treatment revealed that the extracts of 15.2 mg/mL and 10 mg/mL had no significant difference with ivermectin. Additionally, the extract of highest concentration showed 90.06% effectiveness in inhibiting the development of the eggs. In silico results indicated similar biological activity between tannins and ivermectin-B1a, supporting the extract's mode of action against eggs. In conclusion, the in vitro results showed that the chico bark extract inhibited embryogenesis and its effectiveness was comparable to ivermectin. Additionally, the in silico evaluation suggested similar biological activity between tannins and ivermectin. Further in vivo and toxicity assays should be conducted by future researchers.

Awards Won:
Fourth Award of $500