

Biochemical control: use of proteases in the control of gastrointestinal parasites

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Gastrointestinal parasitic nematodes (GINs) are responsible for causing severe health problems in animals on a global scale. The use of chemical anthelmintics is currently the primary way to reduce the proliferation of these parasites in the soil after excretion by the animal. However, this practice indirectly contributes to secondary contamination due to the excessive use of these products, generating potential risks to human and environmental health. Enzymes have stood out to mitigate the proliferation of these helminths more sustainably due to their ability to catalyze the degradation of these nematodes' cuticles. This study aimed to analyze the nematicide action on *Haemonchus* spp in this context. Using three pure industrial proteases (HPP, HPF, and APP1500) provided by the company Prozyn®, all originating from *Bacillus licheniformis*. Each pure enzyme was evaluated at a concentration of 1% (m/v). The experiment was conducted by forming two groups for each enzyme: G1 – Control and G2 – Active—approximately 60 *Haemonchus* spp. larvae were inoculated into the G1 control group and 100 µL of distilled water in 200 µL microtubes, while for the active group, 60 *Haemonchus* spp. larvae and 100 µL of 1% (m/v) enzyme solution were inoculated. Assays were incubated at 25±1°C for 24 hours. After the incubation time, nematode viability was assessed using optical microscopy. The t-test was applied to the results, representing a significant difference (p<0.001) between the control group and pure enzymes. The results indicate that industrial enzymes showed promise in nematode mortality compared to the control group. After 24 hours of incubation, the HPP and HPF enzymes achieved a reduction of 91%, while the APP1500 enzyme achieved an even more significant reduction, reaching 97%. Therefore, the results of this study suggest that *B. licheniformis* proteases have considerable potential as an anthelmintic and may be promising for use as biodefensives in the environmental control of these nematodes, presenting further studies that verify the application of these enzymes in the field.

Keywords: nematicidal action; industrial enzymes; gastrointestinal parasites; sustainability.

Controle bioquímico: uso de proteases no controle de parasitas gastrointestinais

As enzimas industriais HPP, HPF e APP1500, provenientes de *Bacillus licheniformis* foram fornecidas pela empresa Prozyn® e testadas quanto à sua eficácia nematicida contra *Haemonchus* spp., nematoides parasitas gastrointestinais (GINs) de ruminantes. Os resultados demonstraram que essas proteases puras reduziram significativamente (p<0,001) a viabilidade dos nematoides após 24 horas de incubação a 25±1°C. As enzimas HPP e HPF alcançaram uma redução de 91%, enquanto a enzima APP1500 atingiu uma redução ainda mais significativa, chegando a 97%. Este trabalho demonstrou que essas enzimas apresentam um grande potencial como biodefensivos sustentáveis no controle bioquímico desses parasitas, reduzindo sua proliferação.

Palavras-chave: ação nematicida, enzimas industriais, parasitas gastrointestinais, sustentabilidade

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