Technical University of Moldova

ANTHELMINTIC ACTION OF INJECTABLE EPRINOMECTIN IN NATURALLY INFESTED CATTLE

Student: **ALABDAH Yousef**

Coordinator: **PUTIN Victor**
lecturer, PhD

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Teză de absolvire a studiilor superioare integrate
Specialitatea 841.1 Medicină Veterinară

Student: **Alabdah Yousef, MV 193**

Coordonator: **Putin Victor, lect. univ., dr. în științe biologice**

Consultant: **Dumitriu Antonina, asist. univ.,**

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Technical University of Moldova
Faculty of Veterinary Medicine
Department of Food Safety and Public Health

Admitted to defense
Head of Department:
Golban Rita PhD, Associate Professor.

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Diploma Thesis at the End of Integrated Higher Education
Specialty 841.1 Veterinary Medicine

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Coordinator: **Putin Victor, lecturer, PhD**

Consultant: **Dumitriu Antonina, assistant,**

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ABSTRACT

Infestările cu helminți la bovine constituie o problemă semnificativă în zootehnie, influențând negativ sănătatea, productivitatea și bunăstarea animalelor, cu un impact economic considerabil.

Eprinomectina, o lactonă macrociclică din clasa avermectinelor, este un antihelmintic eficient, utilizat pe scară largă datorită spectrului său larg de acțiune și siguranței pentru vacile în lactație.

Acest studiu a avut ca scop evaluarea eficacității eprinomectinei injectabile la bovinele infestate natural, analizând prevalența și intensitatea infestărilor, precum și eficacitatea tratamentului în reducerea extensității și intensității parazitozelor. Studiul s-a desfășurat în exploatația „Premium-Lact" din Durlești, Chișinău, pe un lot experimental de 35 de vaci lactante tratate cu eprinomectină și un lot de control format din 10 vaci netratate.

Probele fecale au fost examinate prin metode coprologice și larvoscopice, cuantificând ouăle și larvele de helminți înainte și după tratament. Rezultatele au arătat o prevalență inițială ridicată: 73,3% pentru strongilatoze digestive și 17,7% pentru strongilidoze respiratorii. Post-tratament, în lotul tratat, extensivitatea infestării a scăzut la 5,71% pentru strongilatoze digestive și la 2,85% pentru strongilidoze respiratorii, iar intensitatea s-a redus semnificativ. Eficacitatea extensității a fost de 94,29% pentru strongilatoze și 97,15% pentru strongilidoze, în timp ce eficacitatea intensității a depășit 97% pentru ambele tipuri de infestări. Lotul de control a rămas cu niveluri ridicate de infestare, confirmând eficiența tratamentului.

Eficacitatea ridicată a eprinomectinei se datorează mecanismului său de acțiune specific, însă limitările asupra larvelor imature sugerează necesitatea unor strategii integrate pentru prevenirea reinfestării.

Concluziile studiului confirmă că eprinomectina este extrem de eficientă în controlul helmintozelor la bovine, dar subliniază importanța monitorizării regulate, rotației antihelminticelor și gestionării corespunzătoare a mediului.

Recomandările practice includ utilizarea eprinomectinei ca parte a unui program integrat de management al parazitozelor, pentru a optimiza sănătatea și productivitatea bovinelor.

ABSTRACT

Helminth infestations in cattle are a significant problem in animal husbandry, negatively influencing the health, productivity and welfare of the animals, with a considerable economic impact.

Eprinomectin, a macrocyclic lactone of the avermectin class, is an effective anthelmintic, widely used due to its broad spectrum of action and safety for lactating cows.

This study aimed to evaluate the efficacy of injectable eprinomectin in naturally infested cattle, analyzing the prevalence and intensity of infestations, as well as the efficacy of treatment in reducing the extent and intensity of parasites. The study was carried out on the "Premium-Lact" farm in Durlesti, Chisinau, on an experimental group of 35 lactating cows treated with eprinomectin and a control group of 10 untreated cows.

Fecal samples were examined by coprological and larvoscopic methods, quantifying helminth eggs and larvae before and after treatment. Results showed a high initial prevalence: 73.3% for digestive strongyles and 17.7% for respiratory strongyles. Post-treatment, in the treated group, the extensiveness of infestation decreased to 5.71% for digestive strongyloides and to 2.85% for respiratory strongyloides, and the intensity was significantly reduced. Extensivity efficacy was 94.29% for strongyles and 97.15% for strongyloides, while intensity efficacy exceeded 97% for both types of infestations. The control batch remained with high levels of infestation, confirming treatment efficacy.

The high efficacy of eprinomectin is due to its specific mechanism of action, but limitations on immature larvae suggest the need for integrated strategies to prevent infestation.

The findings of the study confirm that eprinomectin is highly effective in controlling helminths in cattle, but emphasize the importance of regular monitoring, anthelmintic rotation and proper environmental management.

Practical recommendations include the use of eprinomectin as part of an integrated parasite management program to optimize cattle health and productivity.

CONTENT

INTRODUCTION

Helminth infestations are a major problem in the growth of agricultural animals, including cattle, with a significant impact on animal health, productivity and welfare (Cercel, I., 2014; Naforniță, N.,2019; Dumitriu, A., 2013, a, b; 2022; 2023, a, b; 2025). These parasitic infections, caused by nematodes, cestodes and trematodes, can cause a wide range of clinical and subclinical symptoms, such as weight loss, reduced milk production, anemia and, in severe cases, even mortality. The economic impact of helminthiasis is considerable, the losses being generated by the decrease in growth rate, reduced reproductive efficiency and additional costs associated with veterinary treatments. In many regions, including those with intensive livestock systems, helminth control is an essential component of herd management. Traditionally, anthelmintic drugs have been the cornerstone of helminth control strategies, and macrocyclic lactones, such as ivermectin and eprinomectin, are widely used due to their broad-spectrum efficacy and easy administration.

Eprinomectin, a member of the avermectins subfamily of the macrocyclic lactone class, has stood out in veterinary parasitology due to its potent anthelmintic properties. It works by binding to glutamate-regulated chloride channels in the parasites' nervous system, leading to paralysis and death of helminths. Unlike other avermectins, eprinomectin is distinguished by its unique pharmacokinetic profile, as it is not excreted in significant amounts in milk, making it suitable for use in lactating dairy cows without requiring periods of milk withdrawal. This feature, combined with its efficacy against a diverse range of internal and external parasites, has positioned eprinomectin as a valuable tool in integrated parasite management programs.

However, the increasing prevalence of antihelminth resistance, especially among gastrointestinal nematodes, poses a significant threat to the sustainability of helminth control programmes. Resistance to macrocyclic lactones has been documented in several regions, which makes it necessary to continuously evaluate the efficacy of anthelmintic to ensure that their effectiveness is maintained. In this context, studies evaluating the performance of eprinomectin in field conditions are essential to inform treatment protocols and resistance management strategies.

Scope of the study

The aim of this study is to evaluate the anthelmintic action of eprinomectin administered by injection in cattle naturally infested with helminths. By focusing on a naturally infested population, the study aims to provide information on the efficacy of eprinomectin in real conditions, reflecting typical situations encountered in veterinary practice.

The specific objectives of the study are as follows:

1. Determination of the prevalence (I.E) and intensity of helminth infestations (I.I) in the batch of 36 cows under investigation, using ovoscopic and larvoscopic fecal examination methods.
2. Determination and analysis of E.E and I.E. of injectable eprinomectin.
3. Evaluation of the reduction of parasite load after administration of injectable eprinomectin treatment, by comparing the number of eggs and larvae in pre- and post-treatment fecal samples.

Description of the study

The study will be conducted on a batch of 30 cows selected from a commercial dairy farm. Faecal samples should be collected from each animal prior to treatment and at specified intervals after administration of injectable eprinomectin to monitor changes in parasite load. Ovoscopic and larvoscopic methods will be used for the detection and quantification of helminth eggs and larvae, providing a detailed and accurate assessment of the level of infestation. These standard diagnostic techniques ensure the reliability and accuracy of the data obtained.

Significance of the study

The significance of this study lies in its potential to contribute to the enrichment of knowledge about the efficacy of anthelmintics in cattle, especially in the context of growing concerns about resistance. By evaluating the performance of eprinomectin in a naturally infested population, the study will provide valuable data on its efficacy under typical farm conditions. The results may help refine treatment protocols, ensuring that eprinomectin remains a viable option for helminth control in cattle. The study may also provide insights into the broader problem of anthelmintic resistance, guiding the development of management strategies to prolong the usefulness of macrocyclic lactones in veterinary medicine.

Effective anthelmintic treatments are essential for maintaining the health and productivity of cattle herds. Thus, continuous research on the efficacy and safety of these drugs is indispensable. By focusing on the anthelmintic action of injectable eprinomectin in naturally infested cattle, this study aims to contribute to the optimization of helminth control programs, ultimately supporting the sustainability of cattle production systems.

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