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Popular Article

# Types of Commonly Used Anthelminthic Drugs

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## *Abstract*

Livestock, vital to global agriculture, face constant threats from helminthic infections that significantly impact their health and productivity. This abstract provides a comprehensive overview of anthelmintic strategies employed in livestock farming, focusing on common drug classes and their modes of action against gastrointestinal nematodes and flukes. The primary drug classes discussed include Macrocyclic Lactones (MLs), Benzimidazoles (BZs), Tetrahydropyrimidines-imidazothiazoles, Aminoacetonitrile Derivatives (AADs), and Spiroindoles. The modes of action, including paralysis and disruption of nutrient acquisition, are discussed. Broad-spectrum anthelmintics, preferred for ruminants, offer ease of administration. Effective use of these drugs is crucial for parasite control, with emphasis on preventing resistance through informed management practices. This gives serves as a concise reference for researchers and practitioners in livestock health.

## Introduction

Livestock can be infected with a variety of helminths on pastures, through ingestion of the larvae of the parasites on the contaminated *grass*, the most common of which are gastrointestinal nematodes and flukes. Parasitic worms include tapeworms, roundworms, lungworms, liver flukes, hook worms and whip worms. Worm control in most of farms is exclusively based on anthelmintic treatment rather than management practices.

## Commonly used Anthelminthic drugs

Anthelmintics belong to different drug classes *i.e. Macrocyclic lactones* (MLs), *Benzimidazoles* (BZs), *Tetrahydropyrimidines-imidazothiazoles, Aminoacetonitrile derivatives* (AADs) and

*Spiroindoles.* The compounds of these drug classes are potent against a broad range of nematode species. Broad-spectrum anthelmintics are more commonly used in ruminants because they are capable of eliminating large numbers of parasites, besides being of easy administration and safe to the hosts.

**Mode of action of Anthelmintic drugs**

**Imidazothiazole**

These are acetylcholine agonists that act on the nervous system of the parasite. These drugs cause muscle contraction and paralysis in the helminth, resulting in the eventual expulsion of the parasite from the body. Example: Levamisole

**Macrocyclic lactones**

Glutamate-gated chloride channels (GluCl) causing paralysis of the parasite neuromusculature, including the pharynx, thereby preventing the worm from feeding. Examples: Avermectins and Milbemycin.

**Benzimidazoles**

The target of benzimidazoles is, however, the tubulin within the parasite intestinal cells, which forms into microtubules that are necessary for nutrient acquisition. Benzimidazoles bind to the β-tubulin component preventing it from forming microtubules within the intestinal cells of the helminth. This impairs the uptake of nutrients and prevents the transportation of necessary digestive enzymes resulting in death due to starvation. Another effect of benzimidazoles on nematode is depletion of energy reserves and inhibition of waste excretion. Examples: Albendazole, Fenbendazole, Oxfendazole, Cambendazole *etc.*

**Aminoaceto-nitrile derivative**

It acts as an agonist of the mptl-1 channel, a channel belonging to a class of nicotinic acetylcholine receptors in the process causing constant fluctuation in muscle ions leading to muscle depo-larisation and irreversible nematode paralysis. Examples: Monepantel

**Conclusion**

In conclusion, livestock are susceptible to various helminth infections, primarily gastrointestinal nematodes and flukes, acquired through contaminated pastures. Anthelmintic drugs, such as Macrocyclic lactones, Benzimidazoles, Tetrahydropyrimidines-imidazothiazoles, Aminoacetonitrile derivatives, and Spiroindoles, play a crucial role in worm control. These drugs target different aspects of the parasite's physiology, ranging from the nervous system to nutrient acquisition, resulting in muscle paralysis, feeding prevention, and eventual death. While anthelmintics are widely used, the emphasis should also be on implementing effective management practices to reduce reliance on drug treatments and minimize the risk of resistance development



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