

# ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Training Workplace      Department of Biochemical Sciences

Doctoral Degree Program      Xenobiochemistry and Pathobiochemistry

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**Title of Doctoral Thesis**      Anthelmintics in the environment: circulation, metabolism and effects

This dissertation investigates the environmental impact of anthelmintics, specifically focusing on their circulation, metabolism, and effects in the environment. The primary objective was to explore the extent to which anthelmintics, particularly albendazole, affect plants under laboratory and field conditions and the potential for these effects to contribute to drug resistance in parasites.

The study used an analytical technique, UHPLC-MS/MS, to monitor the uptake and biotransformation of albendazole and biochemical assays to assess phytotoxicity in plants like alfalfa and clover. Field experiments demonstrated the circulation of albendazole and its metabolites from sheep dung to plants and back to the sheep, indicating continuous environmental exposure. Furthermore, the investigation into the parasitic nematode *Haemonchus contortus* revealed changes in the expression of drug-metabolizing enzymes and the nematode's capability to metabolize albendazole, suggesting the potential for developing drug resistance.

The findings highlight the need for a holistic approach to the use of anthelmintics in agriculture, considering not only their effectiveness in controlling parasites but also their environmental impact and the risk of inducing drug resistance. The dissertation contributes significantly to the understanding of the environmental dynamics of veterinary pharmaceuticals and underscores the importance of sustainable agricultural practices and improved drug management strategies.