

Abstract

Charles University in Prague

Faculty of Pharmacy in Hradec Králové

Department of Biochemical Sciences

Candidate: Bc. Nikola Rychla

Supervisor: Doc. Ing. Petra Matoušková, Ph.D.

Title of diploma thesis: **Plasmid constuction for expression of selected reductase from *Haemonchus contortus***

Barber's pole worm (*Haemonchus contortus*) is a pathogenic, gastrointestinal, blood-sucking nematode. Drug resistance in *H. contortus*, and the associated haemonchosis of small ruminants such as sheep and goats, remain a major problem, and their biological and economic impacts are extensive. Given the fact that anthelmintics are still the gold standard of treatment, their reaserch is crucial, not only for farm animals but also for people.

Carbonyl-reducing enzymes, such as aldo-ketoreductases and short-chain dehydrogenases/reductases, belong to the enzymes of the first phase of xenobiotics biotransformation and thus participate in drug metabolism and their increased elimination. Increased elimination leads to decreased toxicity in *H. contortus* and reduced efficacy of drugs in ruminants. Research of these enzymes can help tackle with drug resistance in *H. contortus* and contribute to the development of new drugs in the future.

The aim of this diploma thesis is based on the construction of plasmid, which will be used for gene expression of selected reductase from *Haemonchus contortus*. The reductase was selected based on quantitative analysis of gene expression in three strains of *H. contortus* (ISE, IRE, WR). Plasmid with gene of interest is going to be used to further study the function of the respective enzyme and its involvement in drug resistance in *H. contortus*.