STUDY ON THE INTERACTIONS BETWEEN MYCOTOXINS AND THE RUMEN, ON THEIR POSSIBLE TOXICOLOGICAL EFFECTS ON THE GASTROINTESTINAL TRACT AND THEIR INTESTINAL ABSORPTION IN DAIRY CATTLE: AN *IN VITRO* APPROACH

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INTRODUCTION AND AIMS

Mycotoxin contaminated feed is increasingly being associated with subclinical health problems for high productive dairy cows, reflected by non-specific symptoms and suboptimal milk production. As the risk for (multiple) mycotoxin contamination of dairy rations is high, the detoxifying capacity of the microbiota into the rumen of dairy cows may get depleted (Driehuis et al., 2008; Zachariasova et al., 2014). More and more dairy farmers and veterinarians are concerned about the impact of mycotoxins on the health and performance of dairy cows. Therefore, research about this topic is needed and especially information regarding the effects of co-contamination and a challenged rumen metabolism on mycotoxin detoxification in the rumen is currently lacking. The aim of this project is to elucidate the interactions between the rumen function and mycotoxins, as well as the possible toxicological effects of mycotoxins on the gastrointestinal tract.

MATERIALS AND METHODS

1/ *In vitro* rumen simulations

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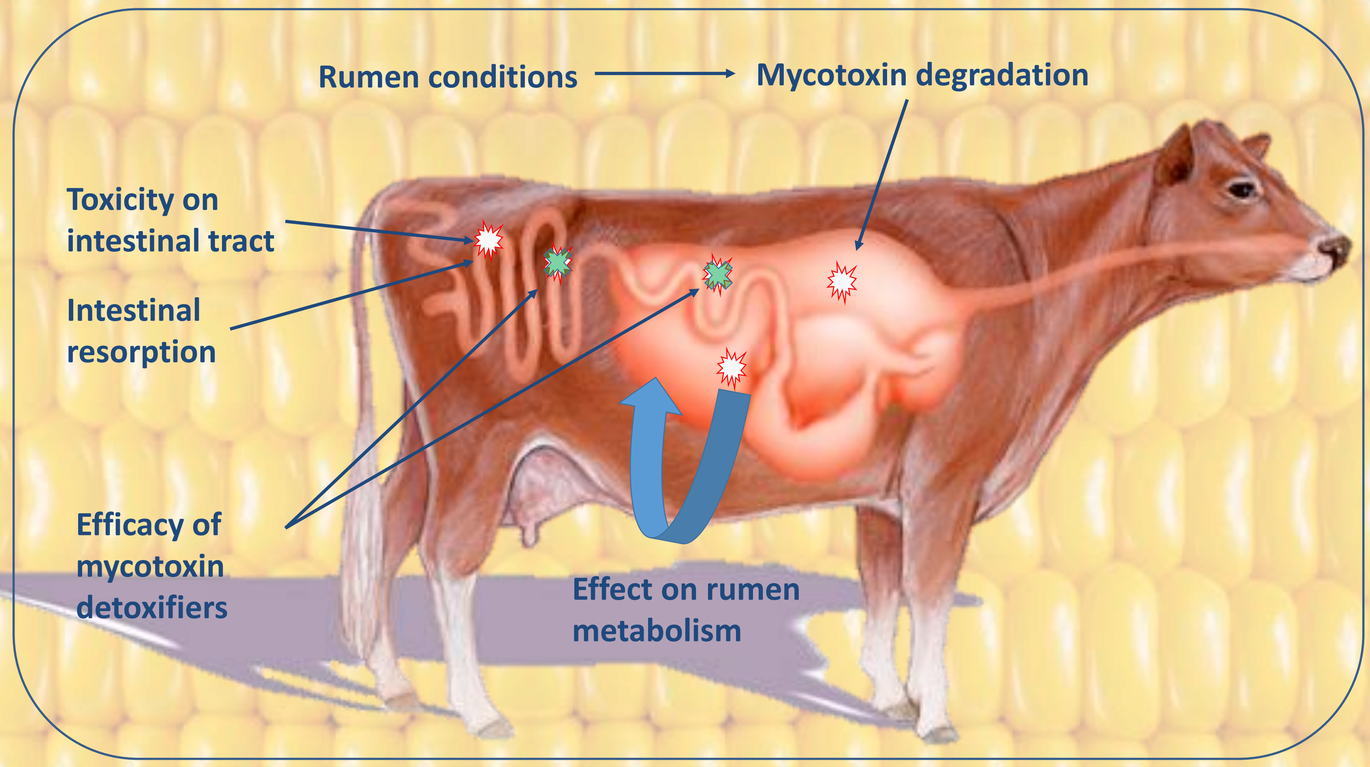
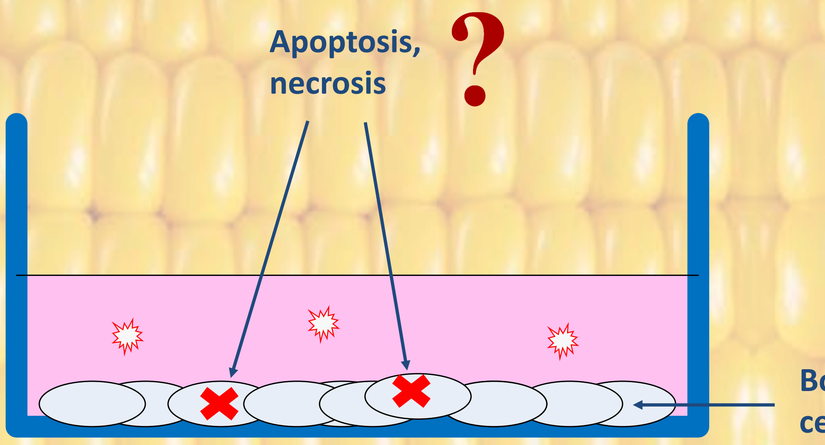
- Determination of mycotoxin degradation with various
  1. dietary characteristics (e.g.: ratios roughage/concentrate, PUFA, toxins/contaminants/residues)
  2. rumen conditions (e.g. pH ↓)
  3. mycotoxin characteristics (e.g.: type, dose, combinations)
- Influence of mycotoxins on rumen fermentation
- Protective effect of mycotoxin detoxifying agents on rumen metabolism

Mycotoxins and metabolites: analysed with UHPLC-MS/MS and UHPLC-HRMS (metabolomics approach)

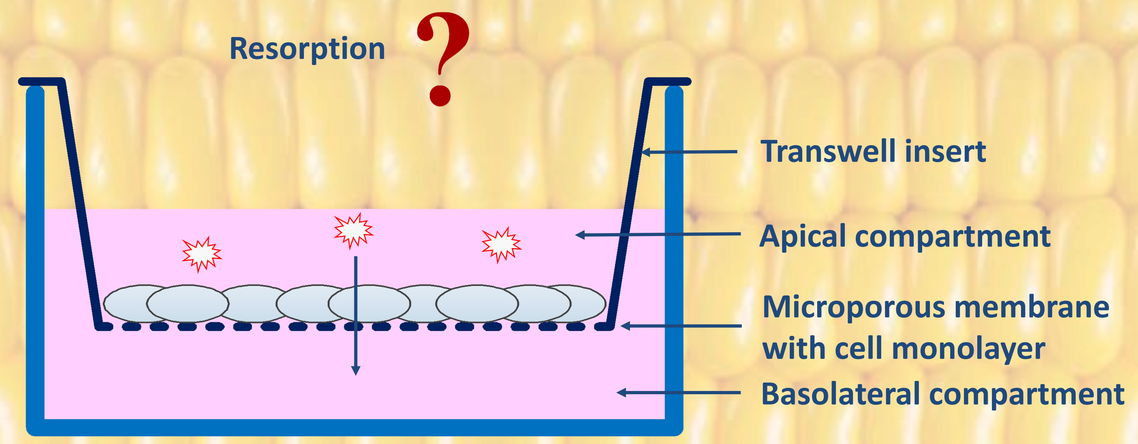


2/ *In vitro* intestinal simulations

2.A Cytotoxicity on intestinal tract



2.B Intestinal resorption



The *in vitro* intestinal simulations (2.A and 2.B) will be performed with and without mycotoxin detoxifiers, in order to determine the protective effect of those agents on intestinal cytotoxicity and resorption when mycotoxins are present.

PROSPECTIVES

Results will give insight into the impact of mycotoxins on rumen metabolism, intestinal toxicity and mycotoxin resorption in dairy cattle. This knowledge will be used in developing a webtool that is part of a bigger project (LA 140971) and that estimates the risks of mycotoxin contamination based on cultivation conditions, harvest methods and silage method. Thanks to the presented project, the decision support system can give an estimation of the risks when mycotoxins are present in feed.

References

Driehuis F., Spanjer M.C., Scholten J.M., Te Giffel M.C. (2008). Occurrence of mycotoxins in maize, grass and wheat silage for dairy cattle in the Netherlands. Food Additives and Contaminants: Part B, 1(1), 41–50.

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