

CHAPTER 1

Objectives: Studies on the metabolism of Ochratoxin A

Mycotoxins are toxins produced by moulds belonging mainly to the *Aspergillus*, *Penicillium*, and *Fusarium* genera and pose a serious health threat to both humans and animals. Contamination can occur at each stage of the processing of various animal and human foods. These toxins can also be carried over to animal-derived food products such as meat, milk or eggs. Several domesticated fungi used in the preparation of seasonings or food like cheese and sausages are also possible mycotoxin producers.

A concerted multi-disciplinary effort is necessary to firstly investigate the metabolic profile of these toxins as well as to evaluate their toxicological properties and secondly to determine the extent of consumption of the specific toxins by humans and animals. **Figure 1** illustrates the diversity of the mycotoxin problem. The experimental data obtained are necessary for the risk assessment and the establishment of international regulatory guidelines.

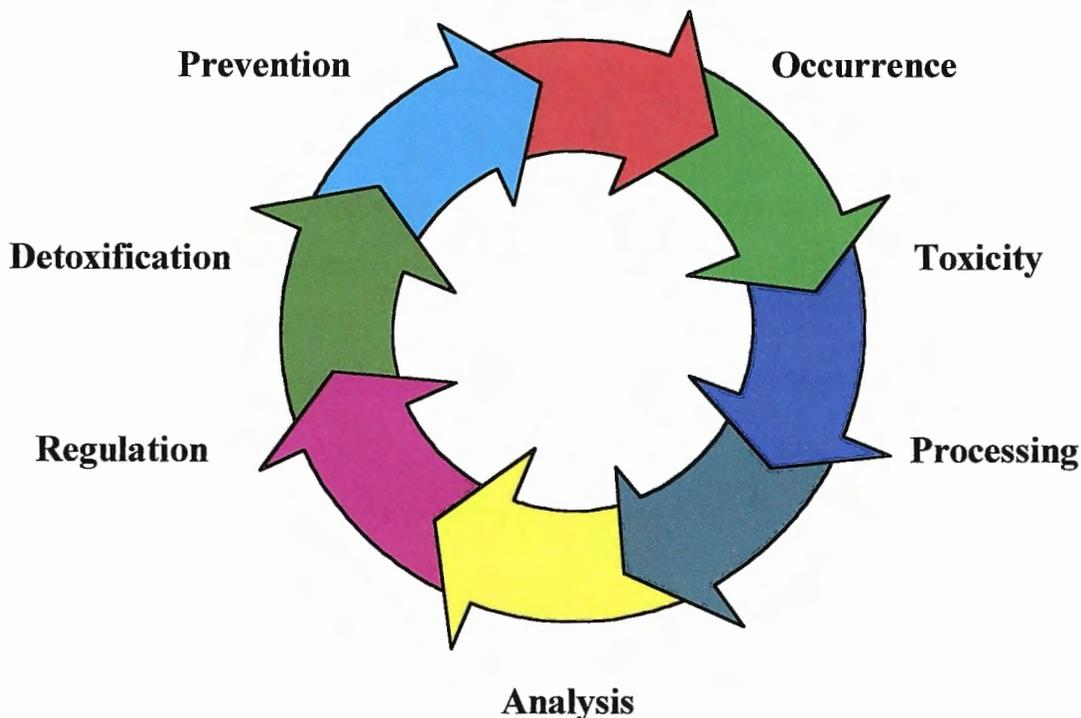


Figure 1: The many facets of the mycotoxin problem are illustrated here

Ochratoxin A is one such mycotoxin that has been proven to have nephrotoxic, carcinogenic, teratogenic and hepatogenic effects on all animal species tested so far (See **Chapter 2**).

The aims of this dissertation are as follows:

1. To gain knowledge into the magnitude of the ochratoxin problem as well as on the work that have been done in the broader mycotoxin field by doing an extensive literature search on mycotoxin related work (**Chapter 2** and **Chapter 3**).
2. To biologically synthesize different halogen containing ochratoxins and to investigate the role that different growth conditions viz. halogen content and period of fermentation have on the production of the ochratoxins by *Aspergillus ochraceus* (**Chapter 4** and **Chapter 10**).
3. To study the structure-function relationships of the ochratoxins and their structure analogues by comparing the kinetics of different ochratoxin analogues upon hydrolysis by carboxypeptidase A (**Chapter 8**).
4. To develop methods for the analysis of ochratoxins in different foodstuffs and to do a survey into the extent of ochratoxin A contamination in coffee on the South African retail market (**Chapter 5** and **Chapter 10**) and to find possible biological ways to prevent ochratoxin contamination in foods or to decontaminate foods, beverages and feeds (**Chapter 6** and **Chapter 7**).
5. To assess the risk that ochratoxin A contaminated foods and beverages hold for humans by studying the toxicokinetics of ochratoxin A in vervet monkeys (**Chapter 9**).

The dissertation will thus comprise all of the facets in **Figure 1**: Occurrence (**Chapter 5**), Toxicity (**Chapters 3** and **9**), Processing (**Chapter 5**), Analysis (**Chapters 4-10**), Regulation (**Chapter 1**) and Prevention (**Chapter 6** and **7**).