FUNGAL GROWTH AND MYCOTOXIN PRODUCTION IN DRINKING WATER

R.R.M. Paterson, **N. Lima**

IBB - Biological Engineering Centre, University of Minho, Braga, Portugal

Background: The evidence for contamination of drinking water with filamentous fungi is becoming accepted[1]. However, growth and mycotoxin production have also been demonstrated[1,2]. These compounds affect bacterial biofilms[3], and have oestrogenic/toxic effects relevant to water systems[4].

Objectives: Establish methods to demonstrate (a) growth of filamentous fungi and (b) mycotoxin production in water.

Methods: Growth: Visual estimation and ergosterol measurement.

Mycotoxins: Immunity affinity columns (IAC), HPLC.

Results:

1. Carcinogenic aflatoxins were detected from stored water at low levels and *Aspergillus flavus* was isolated from the water.

2. *Fusarium graminearum* was demonstrated to grow in drinking water.

3. Oestrogenic zearalenone was produced in the same drinking water in 2. Other metabolites were detected in the same drinking water.

4. *Penicillium expansum* grew in bottled water although patulin could not be detected. Patulin affects the quorum sensing capabilities of bacteria. However, patulin was detected in water agars.

5. IACs can be used to extract large volumes of water.

6. Ergosterol can be used to quantify growth of fungi in water.

Conclusions:

1. Filamentous fungi can grow in water and produce mycotoxins.

2. This may be relevant to biofilm formation, indoor toxicity and oestrogenic activity in water.

3. The use of IACs are recommended by the present authors for mycotoxin analysis of water because large sample volumes can be employed of use for low concentrations of mycotoxins in water.

4. Ergosterol is recommended to measure total levels of fungi in water.

5. These may form the basis of standard methods.

References:

1. Gonçalves, AB, et al. Int J Hyg Environ Health 2006, 209, 257.

2. Paterson, RRM. Mycol Progress 2007, 6, 109.

3. Liaqat, I, et al. Appl Microbiol Biotechnol 2008, 81, 349.

4. Bucheli, TD, et al. J Agri Food Chem 2008, 56, 1029.