

Characterisation of mycoflora and aflatoxigenic fungi from portuguese almonds: from production to commercialisation

Paula Rodrigues^{a,b}, Nelson Lima^a and Armando Venâncio^{a,*}



^aIBB – Institute of Biotechnology and Bioengineering, Centre for Biological Engineering, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal

^bCIMO – Mountain Research Centre, Escola Superior Agrária de Bragança, Campus de Santa Apolónia, 5301-855, Bragança, Portugal



INTRODUCTION

Aflatoxins are among the most carcinogenic natural compounds known, and have been frequently detected in numerous agricultural commodities, nut fruits being among the most contaminated ones. These toxins are a result of the secondary metabolism of fungi belonging to the genus *Aspergillus* Section *Flavi*, namely *Aspergillus flavus*, *A. parasiticus* and *A. nomius*.

The early detection of aflatoxigenic fungal contamination and the preventive control of aflatoxin production seems to be the only viable way to respond to the rigorous limits imposed by EU legislation. In Portugal, knowledge on mycoflora and mycotoxigenic profiles of almonds is scarce. Our objective was to characterise portuguese almonds in respect to mycoflora, with strong emphasis on aflatoxigenic fungi, from production to commercialization.

MATERIALS AND METHODS

Sample collection

Field

Storage

Mycoflora characterisation (Genus *Aspergillus*)

- Fungi isolation on selective media (MEA + 10% NaCl)
- Morphological identification on 3 media (MEA, CYA, CY20S)

Aspergillus Section *Flavi* characterisation

A. flavus

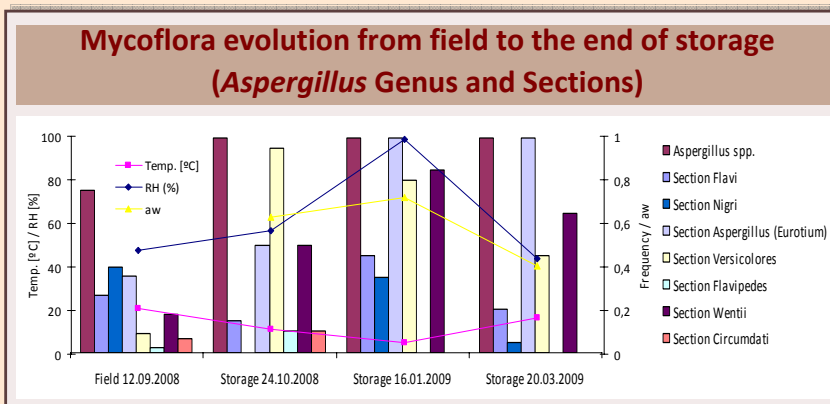
A. parasiticus

A. tamarii

Species	AFPA ^a	Fluorescence ^b	AFB ^c	AFG ^d	CPA ^e
<i>A. flavus</i>	Orange	+	+	-	+
<i>A. parasiticus</i>	Orange	+	+	+	-
<i>A. tamarii</i>	Brown	-	-	-	(+)

a : *Aspergillus flavus* and *A. parasiticus* agar; b : Fluorescence on Coconut Agar Medium (CAM); c : Aflatoxins B1 and B2; d : Aflatoxins G1 and G2; e : Cyclopiazonic Acid

RESULTS



Aspergillus Section *Flavi* Toxigenic profile

Species	Mycotoxins			Number (%) of isolates
	AFB	AFG	CPA	
<i>A. flavus</i> chemotype I	+	-	+	3 (9,1%)
<i>A. flavus</i> chemotype V	-	-	-	3 (9,1%)
<i>A. parasiticus</i>	+	+	-	25 (75,8%)
<i>A. tamarii</i>	-	-	-	1 (3,0%)
Other (not identified)	+	+	+	1 (3,0%)

CONCLUSIONS

1. We have observed a progressive reduction on fungal diversity of almonds from the field to the end of storage, as well as an increase of the frequency of more xerophilic fungi.

2. *Aspergillus parasiticus* is the predominant species of Section *Flavi* (75,8%) and is strongly aflatoxigenic; *A. flavus* is less common (18,2%) and less aflatoxigenic or atoxigenic; other species occur rarely (6,0%).