THE ISOLATION OF ASPERGILLUS SPP FROM HARVESTED MAIZE IN THREE PORTUGUESE REGIONS

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INTRODUCTION

In Portugal, maize (Zea mays L.) is the cereal that involves more agriculture explorations being a source of food, forage and processed products for industry. Fungal infection can result in mycotoxin contamination during growing, harvesting, storage, transport and processing (Chulze, 2010). Poor storage conditions of this commodity can expose it to factors such as high temperatures, condensation, insects and animals, leading to the reduction of its nutritional value, the development of toxigenic fungi and mycotoxin accumulation (Richard et al., 2009). To prevent fungal development it’s important to study the production chain. Aspergillus spp. are usually associated with this cereal during drying and storing (Smapundo et al. 2007), making it susceptible to mycotoxins such as aflatoxins, ochratoxins, cyclopiazic acid and fumonisins. The aim of this study was to evaluate the mycotoxigenic potential of isolated Aspergillus strains from maize samples and correlate it with the sampling place and weather conditions.

MATERIALS AND METHODS

The survey was carried out in three Portuguese regions between November 2008 and April 2009. The samples were collected from producers belonging to the National Producers Association of Maize and Sorghum (ANPROMIS – Associação Nacional de Productores de Milho e de Sorgo):Cooperativa Agrícola de Coimbra (Coimbra); AGROMAIS (Riachos); CERSUL (Santa Eulália/Elvas).

The sampling occurred in three distinct places of the storage chain (figure 1): reception; drying and expediton.

RESULTS AND DISCUSSION

It was possible to obtain, from a total of 132 samples, 1075 isolates from the gender Aspergillus and 732 of these isolates were tested for mycotoxins.

Results show that there are differences between the incidence of the three groups of Aspergillus in the regions. Whereas in Elvas (Portalegre) and Riachos (Santaarém) there is a high incidence of Aspergillus section Nigri, the same doesn’t happens in Coimbra. This may be explained by the fact that black aspergilli are more resistant to the higher solar exposure and higher temperatures, typical of these regions (figure 2).

Riachos has a micro-climate, typically continental with Mediterranean influences due to the proximity of Air Mountains, inducing a very dry and hot climate during summer.

Coimbra climate is dominated by Atlantic influences with high precipitation values and moderate temperatures.

Elvas climate is dominated by Mediterranean influences, being very hot and dry during summer.

CONCLUSION

It is possible to correlate the climate with the kind of isolates obtained, being Aspergillus section Nigri associated with the regions of hotter and dryer climates. Aspergillus section Flavi are very common in all regions even though they are more common after drying and storage. The great majority of fungi are not producers, but there is an alarming quantity of producers of aflatoxins and CPA.

The fact that this strains can produce mycotoxins in ideal conditions doesn’t mean necessarily that they can also produce in the original matrix (maize). Nevertheless, the mycotoxigenic potential of these fungi shouldn’t be ignore because their occurrence means not only an health risk but also a big economical loss.

REFERENCES


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