IAFP Latino 2024
Simpósio Latinoamericano em Segurança dos Alimentos
Santos - SP - Brasil
11 a 14 Nov, 2024

Detection of Triazole fungicide-resistant Aspergillus fumigatus in commercial black pepper samples

Maria Clara Shiroma Buri[1], Arla Daniela Ramalho da Cruz[1], Katherin Castro Ríos[1,2], Paulo Ceresini[1]

[1.] Universidade Estadual Paulista, Depto. de Fitossanidade, Engenharia Rural, e Solos, Ilha Solteira/SP, Brasil
[2.] Universidad Industrial de Santander, Escuela de Nutrición y Dietética, Bucaramanga/Santander, Colombia

Black pepper (*Piper nigrum L.*) is the most consumed spice in the world. Throughout its production chain, particularly during the drying and storage phases of the grains, it can become contaminated by fungi. These fungi present in black pepper can lead to various health issues, either through the production of toxic substances or by triggering diseases, especially in individuals with weakened immune systems. One such fungus is *Aspergillus fumigatus,* which can cause a range of clinical conditions. These conditions include allergic reactions and invasive infections, collectively referred to as aspergillosis, which predominantly affect immunocompromised individuals. Given the potential health risks, this study aimed to evaluate the sensitivity of *Aspergillus fumigatus* obtained from commercial black peppercorn samples to the fungicide tebuconazole. The study sought phenotypic and genotypic evidence of resistance to this triazole fungicide. The methodology involved assessing the growth of the fungus at different concentrations of the fungicide (0, 0.03, 0.5, 2, 4, 8, 16 mcg.mL^{-1}). Following this, a molecular analysis was conducted to investigate potential mutations in the CYP51A gene. This gene is responsible for regulating the biosynthesis of ergosterol in *Aspergillus fumigatus*, a crucial component of the fungal cell membrane. Of the four isolates analyzed, EC50 values ranged from 0.30 to 0.55 mcg.mL^{-1}, indicating varying levels of sensitivity to the fungicide. Notably, one isolate contained the non-synonymous polymorphism M172V in the CYP51A gene. This mutation, however, did not result in significant resistance, as the overall findings confirmed that there is no substantial resistance to the agricultural fungicide tebuconazole in A*spergillus fumigatus* isolates sampled from black pepper. These results are significant for both public health and agricultural practices. The absence of substantial resistance in these fungal isolates suggests that tebuconazole remains effective for controlling fungal contamination in black pepper. Continuous monitoring and research are essential to ensure that this fungicide continues to be effective, thereby protecting consumer health and maintaining the quality and safety of this widely consumed spice. Future studies could expand the sample size and explore other potential mutations to provide a more comprehensive understanding of fungicide resistance in *Aspergillus fumigatus*.

Agradecimentos: We acknowledge the financial support provided for this study. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.