

Emerging processes & hurdles technologies

Oral

Biocontrol of mycotoxigenic fungi by Lactic Acid Bacteria and Yeasts in coffee

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Coffee is the most consumed drink all over the world and Ivory Coast is the 3rd biggest African producer (1). Ochratoxin A (OTA) is a nephrotoxic, teratogenic, immunotoxic, and carcinogenic mycotoxin, mainly produced by *Aspergillus carbonarius* (2). During postharvest, OTA concentration increases due to the contamination with species belonging to the genus *Aspergillus* sections *Circumdati* and *Nigri*. To reduce the presence of OTA, Lactic Acid Bacteria (LAB) and yeasts act as biocontrol agents using direct (adsorption, wall-binding or enzymatic degradation) or indirect (volatiles or metabolites production) mechanisms (3). These mechanisms can also be used to reduce fungal growth. To study the mechanisms that reduce OTA we sampled dry-processed robusta coffee. We isolated, identified, and selected the potentially mycotoxigenic fungal species, and different LAB and yeasts. Confrontation tests of LAB and yeasts against an ochratoxigenic strain of *Aspergillus carbonarius* were run on solid medium in order to select the biocontrol agents with antimycotoxigenic capacity. Furthermore, the mechanisms of OTA reduction were investigated through tests on liquid medium. The technique of metabarcoding of ITS and 16S regions allowed us to analyse the differences on microbial ecology and its relation to the presence of OTA. The creation of an antimycotoxigenic inoculum, that reduces OTA keeping coffee taste and safety, will have a huge economic impact, since OTA legislative limits in Europe lead to the rejection of 40% of coffee imported from Ivory Coast.

1.Ogundeji, B. A., Olalekan-Adeniran, M. A., Orimogunje, O. A., Awoyemi, S. O., Yekini, B. A., Adewoye, G. A., & Bankole, I. (2019). Climate hazards and the changing world of coffee pests and diseases in Sub-Saharan Africa. *Journal of Experimental Agriculture International*, 41, 1-12.

2.Taniwaki, M. H., Pitt, J. I., Copetti, M. V., Teixeira, A. A., & Iamanaka, B. T. (2019). Understanding mycotoxin contamination across the food chain in Brazil: Challenges and opportunities. *Toxins*, 11(7), 411.

3.Ruggirello, M., Nucera, D., Cannoni, M., Peraino, A., Rosso, F., Fontana, M., ... & Dolci, P. (2019). Antifungal activity of yeasts and lactic acid bacteria isolated from cocoa bean fermentations. *Food Research International*, 115, 519-525.