

## **Co-occurrence and toxin-producing potential of *Aspergillus* and *Fusarium* in maize kernels and soil from Migori and Nyamira counties in Kenya**

Aflatoxin and fumonisin are major mycotoxins that frequently contaminate maize, a dietary staple in sub-Saharan Africa. Both toxins are associated with hepatotoxicity, carcinogenicity, and developmental impairments in children. Synergistic toxicological effects may occur when these compounds co-occur, potentially intensifying adverse health outcomes. Despite these risks, few studies have examined the co-occurrence of these mycotoxins within Kenyan food systems. This study investigated the co-occurrence of *Aspergillus* and *Fusarium* fungi in maize kernels and soils from Migori and Nyamira Counties, as well as their potential for mycotoxin production. Fungal isolation and morphological identification were conducted, followed by toxin quantification using Enzyme-Linked Immunosorbent Assay (ELISA) and the Dichlorvos-Ammonia method. Data analyses were performed using R software. *Aspergillus* was the predominant genus, accounting for 52% of the isolates. Aflatoxigenic potential varied by county, with Migori exhibiting a higher potential (77.42%) compared to Nyamira (65.91%). Migori county also recorded the highest fumonisin contamination in both soil and maize samples, at 617.67 ppm, exceeding established safety thresholds. However, there was no statistically significant difference in fumonisin levels between maize and soil samples in Migori ( $p = 0.91$ ). Similarly, fumonisin levels in maize and soil from Nyamira showed no significant difference ( $p = 0.10$ ). These findings demonstrate the co-occurrence of aflatoxin- and fumonisin-producing fungi in Migori and Nyamira, highlighting substantial food safety and public health risks. There is an urgent need for stringent enforcement of food safety regulations by relevant authorities to protect consumers in Kenya's maize dependent communities.