

Health Risk Assessment and Consumer Awareness of Mycotoxin Contamination in Cereals and Legumes in North-West Nigeria

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Abstract—This study evaluated the health risks associated with mycotoxins contamination in food and assessed consumer awareness of mycotoxins across five states in north-western Nigeria during the 2022 harvest and storage seasons. A total of 240 samples of cereals and legumes were analyzed, quantifying 120 mycotoxins and 120 other microbial and plant metabolites using LC-MS/MS. Aflatoxins were detected in all tested food types, with aflatoxin B1 showing the highest prevalence in peanut (61%) and rice (46%), while fumonisin B1 was predominant in maize (90%) and sorghum (66%). Peanut exhibited the highest total aflatoxin concentration (max: 2812 µg/kg), followed by rice (max: 733 µg/kg), whereas maize and sorghum had the highest concentrations of B-type fumonisins (max: 8204 µg/kg and 1335 µg/kg, respectively). Aflatoxin levels in maize were significantly higher ($p < 0.05$) during storage compared to harvest. Chronic exposure estimates indicated elevated risks, with aflatoxins linked to liver cancer cases per 100,000 individuals and fumonisins posing risks of nephrotoxicity and esophageal cancer. Children consuming these foods were identified as the most vulnerable group. Mycotoxin co-occurrence, observed across food types, could amplify health risks. Awareness of mycotoxin contamination was low among farmers, marketers, and consumers, highlighting the need for community education on safe food practices, enforcement of mycotoxin regulations, and increased research on contamination prevention in North-West Nigeria.

Keywords—Legumes, Cereals, Consumer Awareness, Health Risk Assessment, Mycotoxins

Key contribution: Overall, this article contributes critical knowledge to guide public health policies, consumer education, and food safety practices, aimed at reducing mycotoxins exposure in North-West Nigeria