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Pesticide safety among Uganda's smallholder farmers

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Agriculture sector constitutes the backbone of a majority of African economies. Increased cultivation and livestock production have encouraged the rise in pest populations and epidemics. Farmers, through search for pest control mechanisms and the re-establishment of the production potential of land have responded by using agrochemicals. Even though average pesticide use per hectare of cultivated land in Africa is very low compared with other developing countries, hazards arising from the toxicity of the compounds used and widespread and serious shortcomings in handling practices must not be ignored. A 2015 UNACOH survey amongst 175 smallholder farmers from central and eastern regions of the country revealed that 76% of them were using moderately hazardous pesticides (WHO Class II). In terms of knowledge majority (84.1%) mentioned use of personal protective clothing as the most important precaution to safeguard against pesticide exposure, and gum boots (80.7%) was mentioned as most popular PPE component. In terms of practice, expiry date is the issue that majority (33%) are concerned about when buying pesticides, majority store pesticides in the same house where they sleep, 16.5% report to blow with their mouths in a clogged nozzle, gumboots were the most (65.9%) worn PPE although the practice proportion fell short compared to knowledge (80.7%). Some farmers reported to be using polythene bags and handkerchiefs as perfect substitutes for hand gloves and nose mask respectively. Farmers further reported experiencing the following symptoms shortly after working with pesticides; skin irritation (40.2%), blurred vision (10.2%), nausea (8.7%), dizziness (8.3%), and headache (7.1%).

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Molecular systematic and metabolomic fingerprinting approaches to understand and control aflatoxin biosynthesis in isolated *Aspergillus* species

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Food spoilage and poisoning pathogens lead to pre- and post-harvest losses of crop produce and feed stuff leading to food insecurity and safety worldwide. Aflatoxins are fungal toxins derived from some strains of *Aspergillus flavus*. Kenya has experienced worst outbreak of aflatoxin poisoning where 317 cases and 215 deaths reported. This problem appears endemic to certain Kenyan regions as every year cases are reported. The Maize kernels were collected from high and low risk aflatoxicosis regions, surface sterilised and plated on potato dextrose agar. The 37 isolated *Aspergillus flavus* strains were identified to species level using morphological, anatomical and molecular characteristics based on ITS 1 and ITS 2 molecular marker. Mycotoxin detection by CAM under UV light (365 nm) revealed blue fluorescence (57%, n=21) and (43%, n=16) green. Our findings were further validated through advanced metabolomics fingerprinting approaches (TLC, HPLC and LC-MS/MS) and vegetative compatibility groupings (VCGs). We concluded that strains from Makueni (78%, n=7) might be producers of aflatoxin AFB1, AFB2, the most potent mycotoxins. This could be so far a reason why there has been high risk of constant aflatoxicosis in Makueni as compared to other three study counties.

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