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Mycological Evaluation of Maize (Zea mays) Flour Use in Complementary Feeding in Handeni District, Tanzania

Abstract

Maize (*Zea mays*) user practices influence the presence of mycotoxin contamination in food. The main objective of this study was to determine the level of mycotoxin contamination in maize flour used in complementary foods for infants in rural Handeni District. The specific objectives were to: i) investigate the maize storage and consumption practices of farmers in rural Handeni District (Seza Kofi and Kwabojo villages), and their implications for aflatoxin and fumonisin contamination of maize flour; ii) determine the occurrence of toxigenic molds in maize flour used for complementary feeding; and iii) evaluate the aflatoxin and fumonisin contents in maize flour used for complementary feeding. A qualitative research design utilizing a cross-sectional, interviewer-administered survey was conducted in two wards in Handeni District, Tanzania to identify maize consumption practices of farmers. Maize samples were collected in the two wards during harvesting and storage phases. Toxigenic molds, Aflatoxin and Fumonisin concentrations in maize flour samples were evaluated. Farmers traditionally store their maize in two traditional ways, namely in roofing and in sacks. Analyses showed variable mold counts for samples from the two wards. Mold contamination in samples ranged from 9×10^2 to 3.9×10^5 CFU/ml. In general, the concentration of Aflatoxin was low both in harvesting and storage maize samples from Kwabojo and Seza Kofi. Roughly 92% of the maize flour samples had Aflatoxin below the National regulatory limit of 10 ppb. The levels of mycotoxin in the two wards were significantly ($p < 0.05$) different from each other. Of the 60 samples analyzed, 93% showed Fumonisin concentrations above the maximum tolerance limit set by Codex Alimentarius of 1 ppm. Fumonisin levels in the maize samples from Kwabojo were significantly ($p<0.05$) higher than those from Seza Kofi (5.0±2.1 versus 3.4±2.2 ppm), and higher than the regulatory level of 1 ppm. The maize samples from harvest and storage times in Kwabojo village had Fumonisin levels ranging from 0.8±0.4 to 9.4±2.3 and 0 to 8.7±0.1, respectively. In Seza Kofi, the maize samples from harvest and storage times had Fumonisin levels ranging from 0.8±0.4 to 6.5±6.4 and 0.9 to 7.0±3.5, respectively. Households in the two wards might be at risk for Fumonisin contamination. There should be a combined effort of all stakeholders - household members, government agencies, research Institutions and nongovernmental organizations to educate the communities about Fumonisin reduction in maize.