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Assessment of Mycotoxins Contamination in Rwanda: a Seasonal and Regional Comparison

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Abstract

Aflatoxins contamination in maize produce in Rwanda is not well documented and constitute a major thread on food safety. Existing studies have only focused on evaluation of the contamination level in maize found in marketplace, but little has been done concerning the causes of contamination at the farm level. In this study, maize samples from two different agro-ecological zones (AEZ) of Rwanda were collected from local farmers' cooperatives. Sample collection was done during harvesting of the agricultural season A (wet) and B (dry) 2018–2019. Maize was analysed for moisture content and aflatoxins contamination. Drying and storage environmental conditions were monitored using temperature and humidity sensors. Results showed a difference in temperature and humidity conditions from the two regions of study. The calculated absolute humidity was on average 13.35 g kg⁻¹ in the eastern savannah AEZ and 10.079 g kg⁻¹ for the volcanic region, respectively. Examination of the moisture content of maize showed an average moisture content above the acceptable level of 13.5 % for most samples obtained in both AEZs. Aflatoxins contamination was in general below the standard limits of 10 µg kg⁻¹ except for some samples from Nkotsi, Bigogwe, Karago and Bushara that had a high contamination of 371.98 µg kg⁻¹, 201.35 µg kg⁻¹, 116.44 µg kg⁻¹ and 25.30 µg kg⁻¹ respectively. The study found that the average total aflatoxins contamination was 70.61±138.77 µg kg⁻¹ in the volcanic region and 3.22±0.45 µg kg⁻¹ for eastern savannah. There was a significant difference among seasons (t-test = 0.95 = 0.0229) where the contamination was higher in season B than season A. The high concentration in the volcanic region can be due to the climatic conditions differences and further studies need to be conducted in order to clarify this issue.

Keywords: Absolute humidity, cropping seasons, maize storage, moisture content, mycotoxins contamination, postharvest handling