16. Development of integrated strategies for reducing aflatoxin contamination in maize during storage

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Abstract

Aflatoxin levels increase during storage due to high humidity, temperature, and insect pests which support fungi producing mycotoxins. The study aimed to determine the effectiveness of treating maize grain with three levels of natural products. Maize grains samples were collected from Kilifi and weighed to 1kg each. Three levels of Moringa oleifera powder, wood ash from Eucalyptus globulus and diatomaceous earth were used, including drying on bare ground and a control (no treatment). The design was a completely randomized design (CRD) replicated three times. Maize grains were stored in polypropylene bags for three and six months and total aflatoxin quantification was performed using ELISA. At six months' aflatoxins levels had increased up to ten times from the three months' storage. In the six months the total aflatoxins levels were 0.84 µg/kg for wood ash from Eucalyptus globulus at 7.5g/kg of maize with lowest total aflatoxins levels. The first five treatments were efficient because the total aflatoxin levels were below 10 µg/kg as recommended by the Kenya Bureau of Standards (KEBS) for human food. The diatomaceous earth 1g/kg (16.76 µg/kg), dried on a bare floor with an 18.3 µg/kg fit for animal feed and below 20 µg/kg used for animal feed. Storage periods of over three months increased total aflatoxin levels. The use of wood ash (Eucalyptus globulus) at low, medium and high levels reduces aflatoxins through the control of insect pests and fungi. Additionally, the use of diatomaceous earth and Moringa oleifera powder at low and medium levels was effective. Integrated strategies for reducing aflatoxin contamination in maize during storage in this study proofed effective.

Keywords: *Aflatoxin; Diatomaceous earth; ELISA; Mycotoxins; natural products*