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Fungal Pathogens Associated with Stored Maize and Nutritional Quality Losses Along Supply Chain in Southwestern Ethiopia: Implication for Food Security

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Abstract

Food security and economic well-being of Ethiopia in general depend on agriculture. Maize is considered amongst the top commodities which serve as food security due to its wide adaptability, high production, productivity and relatively cheap calories compared to other cereals. As a result it is included in the national food security strategy. However, maize postharvest losses are tremendous, leading to quantity and quality losses but these are poorly addressed. Therefore, this study was initiated to assess fungal pathogens associated with stored maize and nutritional quality losses along maize supply chain in southwestern Ethiopia. Multistage sampling technique was employed to select five districts that represent different agro-ecologies and major maize producers for fungi mycoflora assessment. Three districts out of five were purposely considered for nutritional and anti-nutritional analysis. In each district different actors along the supply chain were randomly selected for sample collection. Data collection was carried out monthly for fungal damage assessment, and every second month for nutritional analysis till six month storage period. Fungal identification was done by means of morphological characterisation. Nutritional and anti-nutritional analysis was carried out following international standard of Association of Analytical Chemists methods. Collected data were analysed using appropriate software including SAS (version 9.2) general linear model (GLM). Fungal pathogen incidence and severity significantly ($p < 0.05$) increased throughout the study period. *Fusarium* spp., *Penicillium* spp., *Aspergillus* spp., *Phoma* spp., *Geotricum* spp., *Cladosporium* spp. and *Drechslera* spp. were genera isolated. However, *Fusarium*, *Penicillium* and *Aspergillus* spp. which are able to produce mycotoxins were the most dominate fungal genera identified. Crude protein, crude fat, carbohydrate, caloric value and phosphorus content were significantly ($p < 0.05$) decreased as the storage duration increased. But, fiber, ash and major minerals (Ca, Zn and Fe) content were increased along the storage period. This implies the storing maize under traditional storage conditions leads to high damage by fungal pathogens and negatively affects the nutritional content. It has great implication on nutrition insecurity and hidden dietary hunger for the society. Thus, there is a need to develop and disseminate appropriate storage technologies that minimise quantity and quality loss in the store.

Keywords: Agro-ecology, fungi, nutrition loss, storage duration, stored maize

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