Available online at www.asric.org
ASRIC Journal on Agricultural Sciences 1 (2022) 14-27

Prevalence of Aflatoxin Contamination along the Groundnut Value Chain Actors in Different Agro-Ecology and Evaluation of Groundnut Varieties for Resistant to Aspergillus flavus and Aflatoxin Contamination in Eastern Ethiopia

Ephrem Guchi[1*], Amare Ayalew[2], Belachew Asalf[3]

[1]Samra University, College of Natural and Competational Sciences, Department of Applied Biology, Samara, Ethiopia
[2]Haramaya University, School of Plant Sciences, Department of Plant Pathology, Haramaya, Ethiopia
[3]Norwegian Institute of Bioeconomy Research, Norway

*Corresponding author: Ephrem Guchi; Email: ephremg21@gmail.com; Tel: +251911767906

Received 6 July 2022; revised 31 July 2022; accepted 23 September 2022

Abstract

Aflatoxins are common contaminants in groundnut and pose considerable risk to human health and have significant economic implication. Although, aflatoxin contamination of groundnut could occur in the field, in storage and during marketing, the level of contamination may vary along the value chain. The objective of this study was to determine level of aflatoxin concentration in groundnut along the value chain actors, and to evaluate groundnut varieties for resistant to *A. flavus* infection and aflatoxin contamination in Eastern Ethiopia. A total of 120 groundnut samples, which is 45 from farmers' fields, 45 from farmers' stores, and 30 from open air vendors, were collected and analysed for aflatoxin contamination in an ELISA test. Moreover, sixteen groundnut varieties were evaluated in this study. Field seed infection and colonization by *A. flavus* was determined using plate counting methods. The result revealed that, the level of aflatoxin contamination significantly varies along the value chain. Out of the total 120 samples, aflatoxin was detected on 91 samples, ranging from 1 ppb to 1012 ppb. Aflatoxin concentration were above 15 ppb in 85% of the positive samples collected from farmers' stores at Fedis district. Moisture contents and aflatoxin level of groundnut samples were positively correlated (r = 0.956) and significant ($p \leq 0.05$). There was also a significant and positive correlation (r = 0.959) between *A. flavus* infection and total aflatoxin levels. Moreover, the result revealed that all tested varieties were significantly different ($p \leq 0.05$) in response to *A.flavus* infection and aflatoxin levels. Among the varieties evaluated, *Baha Gudo* (13.70%), *Sartu* (14.00%) and *Sedi* (14.23%) were resistant to *A.flavus* infection. Inaddition, *Baha Gudo* (1.93 ppb), *Sartu* (3.70 ppb) and *Sedi* (6.40 ppb) were resistant to aflatoxin contamination. We suggest pre-harvest and post-harvest management of *A. flavus* infection so as to reduce the level of aflatoxin contamination at farmers' fields and farmers' stores and to maintein the quality of groundnut along the value chain. Also the varieties that showed resistance could form part of an integrated management of aflatoxin contamination in Eastern Ethiopia.

Keywords: Aflatoxin, Aspergillus flavus, Groundnut Varieties, Reaction, Value chain

1.0 INTRODUCTION

Groundnut (*Arachis hypogaea* L.), is a multipurpose cash crop for domestic markets as well as for foreign trade in several developing and developed countries. In Ethiopia, groundnut has a huge potential as

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