

## Occurrence and Levels of Mycotoxins in On-Farm Stored Sesame in Major-Growing Districts of Ethiopia

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**Abstract :** The occurrence of mycotoxins in sesame seeds poses a significant threat to food safety and the economy in Ethiopia. This study aimed to determine the levels and occurrence of mycotoxins in on-farm stored sesame seeds in major-growing districts of Ethiopia. A total of 470 sesame seed samples were collected from randomly selected farmers' storage structures in five major-growing districts using purposive sampling techniques. An enzyme-linked immunosorbent assay (ELISA) was used to analyze the collected samples for the presence of four mycotoxins: total aflatoxins (AFT), ochratoxin A (OTA), total fumonisins (FUM), and deoxynivalenol (DON). The study found that all samples contained varying levels of mycotoxins, with AFT and DON being the most prevalent. AFT concentrations in detected samples ranged from 2.5 to 27.8 parts per billion (ppb), with a mean concentration of 13.8 ppb. OTA levels ranged from 5.0 ppb to 9.7 ppb, with a mean level of 7.1 ppb. Total fumonisin concentrations ranged from 300 to 1300 ppb in all samples, with a mean of 800 ppb. DON concentrations ranged from 560 to 700 ppb in the analyzed samples. The majority (96.8%) of the samples were safe from AFT, FUM, and DON mean levels when compared to the Federal Drug Administration maximum limit. AFT-OTA, DON-OTA, AFT-FUM, FUM-DON, and FUM-OTA, respectively, had co-occurrence rates of 44.0, 38.3, 33.8, 30.2, 29.8 and 26.0% for mycotoxins. On average, 37.2% of the sesame samples had fungal infection, and seed germination rates ranged from 66.8% to 91.1%. The Limmu district had higher levels of total aflatoxins, kernel infection, and lower germination rates than other districts. The Wollega variety of sesame had higher kernel infection, total aflatoxins concentration, and lower germination rates than other varieties. Grain age had a statistically significant ( $p < 0.05$ ) effect on both kernel infection and germination. The storage methods used for sesame in major-growing districts of Ethiopia favor mycotoxin-producing fungi. As the levels of mycotoxins in sesame are of public health significance, stakeholders should come together to identify secure and suitable storage technologies to maintain the quantity and quality of sesame at the level of smallholder farmers. This study suggests the need for suitable storage technologies to maintain the quality of sesame and reduce the risk of mycotoxin contamination.

**Keywords :** districts, seed germination, kernel infection, moisture content, relative humidity, temperature

**Conference Title :** ICMPT 2024 : International Conference on Mycotoxins, Phycotoxins and Toxicology

**Conference Location :** Bucharest, Romania

**Conference Dates :** May 16-17, 2024