ABSTRACT: In many African Sub-Saharan countries, maize storage is a significant challenge for farmers due to rains at harvest, which makes grain drying difficult, and high humidity, which can rewet dried grain. A second challenge for maize farmers is contamination with the mycotoxins aflatoxin and fumonisin. Prior to harvest, fungi infect maize kernels and produce these mycotoxins. After harvest, the mycotoxin can continue to accumulate until the grain is dried to moisture levels below the optimum for fungal growth. The biocontrol product Aflasafe is under trials as a management option to reduce the risk of aflatoxin in preharvested maize. Hermetic-storage systems, such as Purdue Improved Crop Storage (PICS) bags are being promoted to prevent grain rewetting during storage in the humid environments. Our objectives are to compare the populations of fungal species in maize stored on-farm in Kenya for three months in PICS bags with maize stored in traditional woven bags. We will also determine the effect of these storage practices on levels of aflatoxin and fumonisin. Understanding the changes that occur because of these practices will allow an assessment of potential risks and benefits.