

MANUAL FOR MAIZE HANDLING AND STORAGE



Feed the Future Innovation
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Suppression of Potential Aflatoxin reduction in maize tips

Aflatoxin contamination problems are minimized by management practices such as thoroughly grain cleaning, proper combine adjustment to reduce kernel damage, matching drying capacity to wet corn holding capacity, proper drying, removal of fines and broken kernels, proper grain cooling after drying, and sound storage practices.

Dry Properly

Drying temperature and drying time may influence the development of aflatoxin in stored grain. Slow drying with low heat over long periods could promote aflatoxin development.

Field Drying

After reaching maturation stage, maize can be kept standing in the field, although there is a risk that unexpected rains will cause re-wetting. Bend over the maize cobs to prevent moisture reaching them through the stem. Pile stalks with heads into standing heaps ('stooks') to allow cultivation of the field, although this may slow down the drying rate.

Sun drying

After shelling, maize can be dried by spreading it in thin layers on a drying platform, black polythene or cloth sheet, or empty sacks in the sun (below 13% moisture) to prevent mould growth.



Maize Storage

The commonly used methods for storing maize are described below. These structures can hold up to two tonnes, though some may hold much more.

Platforms and frames

Frames consisting of narrow timber or bamboo poles fixed horizontally to heavy upright poles embedded in the ground can be used for holding maize cobs during drying. Platforms and frames can be made at minimal cost from local materials. Improvements to platforms in the open are limited to the fixing of rodent guards to the legs. It is easy to load and empty platforms and frames



Frames



Platforms

Drying and storage cribs

Metal Storage bin

Metal storage bins used for storing maize are made from smooth or corrugated galvanized metal sheets.



Bag storage

Bag storage is a convenient way of keeping threshed maize. Bags are usually made from jute or woven polypropylene, but hemp, sisal, grass and polythene sacks are also available.



Hermetic storage bag

This is an improved storage bag that is based on triple bagging. It is a convenient way of storing maize to keep it away from insect infestation and further mould proliferation.



Keeping the maize store in good condition

A good store will keep the maize dry, cool and free of mould growth.

- It should provide protection against rodents, poultry, birds and browsing domestic animals.
- It should be theft proof.
- Stores should be sited in areas that are not prone to flooding; the soil should allow water to drain away readily.
- The store should have a roof to keep rain off the structure and to provide shade during the heat of the day. To prevent groundwater soaking into the store, the structure must be raised off the ground.
- Vegetation around the storage structure should be removed, and a weed-free facility should be maintained as weeds may be a source of fungal infection.
- Spills should be avoided as they can attract and shelter pests in the storage areas.

- At the beginning of the new storage season the empty store must be cleaned. Residues of old grain and other rubbish must be removed and burnt.
- For longer term storage, inside and outside of the empty storage structures should be treated with an approved insecticide.

Cleaning Maize to Reduce Aflatoxin

Mould and aflatoxin levels in maize are normally higher in the fine material – commonly referred to as “fines.” Removal of the fines can reduce aflatoxin levels up to 50 percent. Corn having little fine material, however, may not be improved substantially by cleaning.

Monitoring of Stored Maize Grain

Regular monitoring of stored grain is essential to avoid fungal growth and mycotoxin production. Monitoring every 3–4 weeks during cold months and every 1–2 weeks during warm months is essential. Regular inspection and repair of leaky roofs and other holes is necessary to avoid water infiltration.

Reducing Aflatoxin in Maize Grain during Transportation

Transport container should be dry, airtight and free from foreign matter, visible mould growth, insect, musty odour and any other contaminated material that could contribute to mycotoxin production. Vehicle should be covered with tarpaulin and temperature fluctuations in the vehicle should be minimised to prevent condensation on the grain which could lead to moisture build up and subsequent fungal growth and in turn, aflatoxin production during transportation.