

## Integrated Strategies to Minimizing Aflatoxin Contamination in Groundnut

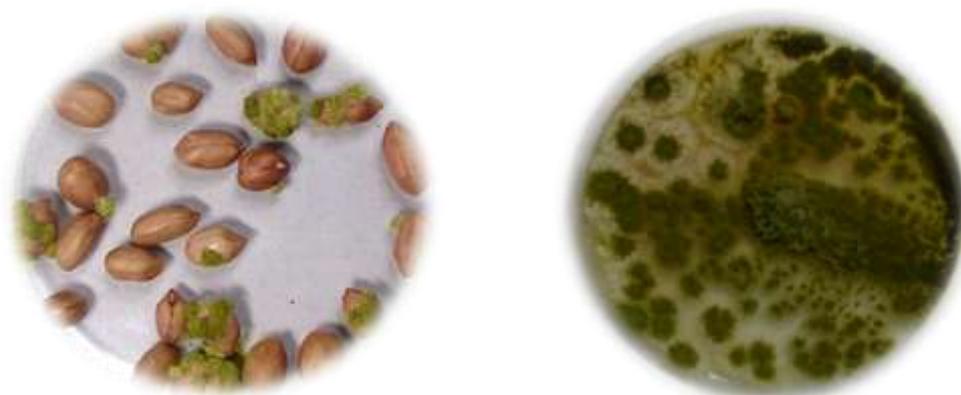
**G**roundnut is an important oilseed and food crop. India has the largest peanut growing area in the world and is the second largest producer after China. Gujarat, Rajasthan, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra and Madhya Pradesh are the major groundnut growing states of India and together account for about 90% of the national area under groundnut. Owing to their desirable quality attributes, Indian groundnuts are highly demanded in global markets. However, maintaining this export potential requires strict compliance with international quality and safety standards.

Aflatoxin contamination remains a major challenge for groundnut export. Aflatoxins are natural toxins produced by *Aspergillus* fungi and more than 20 types are known. Among these, aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> mainly produced by *Aspergillus flavus* and *A. parasiticus* are the most important because they pose serious food safety risks and affect international trade.

Aflatoxin B<sub>1</sub> is recognized as a potent genotoxic carcinogen and is strongly associated with hepatotoxicity and liver cancer risk. Aflatoxin-producing fungi are capable of colonizing and contaminating groundnut at multiple stages, including pre-harvest in the field, during post-harvest handling and transportation and throughout storage under conducive environmental conditions.

The aflatoxin contamination is now recognized as the chief non-tariff trade barrier for export of groundnut from India. Due to aflatoxin contamination, several consignments have been rejected at the destination ports in past several years. Production of material completely free from aflatoxin, however is not possible as fungus responsible for the toxin is ubiquitous and is abundantly present in soils where groundnut is generally grown.

Nevertheless, adopting integrated strategies at pre and post-harvest stage along with proper storage and good manufacturing practices (GMP) can significantly minimize aflatoxin contamination. These integrated strategies, outlined below that provide a practical framework for farmers and processors to effectively reduce fungal infection and toxin formation throughout the groundnut value chain.



*Aspergillus flavus* Infection in Groundnut

## Integrated Strategies to Minimizing Aflatoxin Contamination in Groundnut

### A) Pre-harvest strategies

1. Crop rotation with onion/garlic during summer.
2. Deep ploughing (8–10 inches) in summer.
3. Apply well decomposed farm-yard manure/compost at 5–10 tonnes/ha.
4. Apply neem/castor cake at 500 kg/ha in furrows at the time of sowing.
5. Select short/medium duration groundnut varieties.
6. Seed treatment with Tebuconazole 2% DS at 1.25 g or Carboxin 37.5% + Thiram 37.5% WS at 3g per kg seed or Imidacloprid 18.50 % + Hexaconazole 01.50 % FS at 2 mL/10 L water (for control of termite & soil borne disease) or with commercial formulations of *Trichoderma harzianum* or *T. viride* at 10 g/kg seed.
7. Follow inter-row water harvesting by adopting paired row method of planting for conservation of moisture.
8. Advance sowing by a fortnight with a pre-sowing irrigation to evade end of season drought.
9. Avoid mid-season or end-of-season drought by providing supplemental irrigation for rain-fed groundnut.
10. Termite control is also very important to prevent damage to developing pods, especially as the crop matures with application of Imidachloprid at 3 mL/10 L water (depends on the severity).
11. Application of lime to the crop supports development of strong shells (pod resistance). Strong shells provide the first line of defence against pest and fungal attack. Apply gypsum at 400–500 kg/ha at the time of flowering.

### B) Harvest and post-harvest strategies

1. Harvest the crop at the right time when it is fully mature.



2. Avoid mechanical injuries to pods during harvesting and threshing.
3. Dry the uprooted plants along with the pods by keeping them upside-down (windrow drying) i.e. foliage towards ground and pods upwards.



4. Dry the pods to a safe moisture level of 7%.
5. The patches of field that have undergone stress or harboured diseases or pest infested is likely to contain aflatoxin and hence should be harvested, dried and stocked separately as this produce.
6. Do not mix immature, mechanical or insect damage and leftover pods with the harvested mature pods.
7. Defective (mouldy, discoloured, rancid, decayed, shrivelled and insect damaged) pods/kernels should be separated.
8. Follow dry shelling and avoid re-wetting of pods before shelling.
9. Post-harvest processing technologies viz., sorting of peanuts with camera/laser sorter and by hand picking are likely to remove aflatoxin contaminated kernels. Value addition process like blanching, roasting etc. minimize the aflatoxin contamination.



10. Store produce in cool and dry conditions only.
11. Store the produce in clean polythene lined gunny bags or HDPE or PICS bags and stack them on wooden or plastic planks or on tarpaulin.



12. The storage should have good roofing to prevent groundnuts from getting wet by seepage or leakage when it rains.
13. Maintain hygiene and good ventilation.
14. Prevent the damage of pods by insects in storage by fumigation with aluminium phosphide (56%) at 10g / ton of pods.

\*\*\*\*\*

*For more information, technical guidance, training support or queries related to aflatoxin management in groundnut please contact:*

**Dr. Chiragkumar M. Bhaliya**  
**Senior Scientist (Plant Pathology)**  
**Crop Protection Unit**  
**ICAR-IIGR, Junagadh.**  
**E-Mail: [chirag.bhaliya@icar.org.in](mailto:chirag.bhaliya@icar.org.in)**