Overview
Aflatoxins, produced by Aspergillus flavus and A. parasiticus, pose a major threat to food safety. Many agricultural commodities, including groundnut (peanut), are contaminated by aflatoxins each year, affecting trade, human and livestock health.

ICRISAT scientists devised a simple and affordable test kit using in-house-developed polyclonal and monoclonal antibodies.

The test uses a competitive enzyme-linked immunosorbent assay (cELISA) to rapidly detect the presence of aflatoxin.

Results obtained using cELISA are comparable with those of the highly sensitive HPLC. Also, cELISA requires minimum laboratory facilities, and chemicals are locally available in developing countries.

The kit has drastically reduced the cost of testing agricultural commodities for aflatoxin.

The impact
The cELISA test provided a unique opportunity for ICRISAT and its partners to monitor food and feed commodity value chains and identify entry points for aflatoxin contamination.

ICRISAT helped to set up aflatoxin-monitoring laboratories in India, Mozambique, Kenya, Malawi and Mali. Local personnel were trained to manage the facility.

The 1970s saw Malawi’s status as a major groundnut exporter eroded due to aflatoxin outbreaks. The National Smallholder Farmers’ Association of Malawi (NASFAM) has successfully used the cELISA technology in conjunction with HPLC as part of a broader effort to regain its once lucrative European export market during the past 5 years.

The innovation
- The key lies in efficiently and inexpensively detecting aflatoxin, the invisible killer.
- Developed countries use expensive chromatography based technologies in sophisticated laboratories for routine quantitative estimation.
- This high cost of aflatoxin estimation constrains the development of integrated aflatoxin management technologies.

Components of the aflatoxin testing kit and some susceptible food material.

Aspergillus flavus infected groundnuts (on the left) beside healthy groundnuts.

Principals Scientist Farid Waliyar displaying aflatoxin quantification using the cELISA reader.

Magnification of the Aspergillus fungus that produces aflatoxin.

Technology transfer. The benefits of detecting aflatoxin-infected grain will eventually impact on the livelihoods of poor farmers.

Hands-on training for research personnel.

Demonstrating the aflatoxin testing kit to visiting scholars.