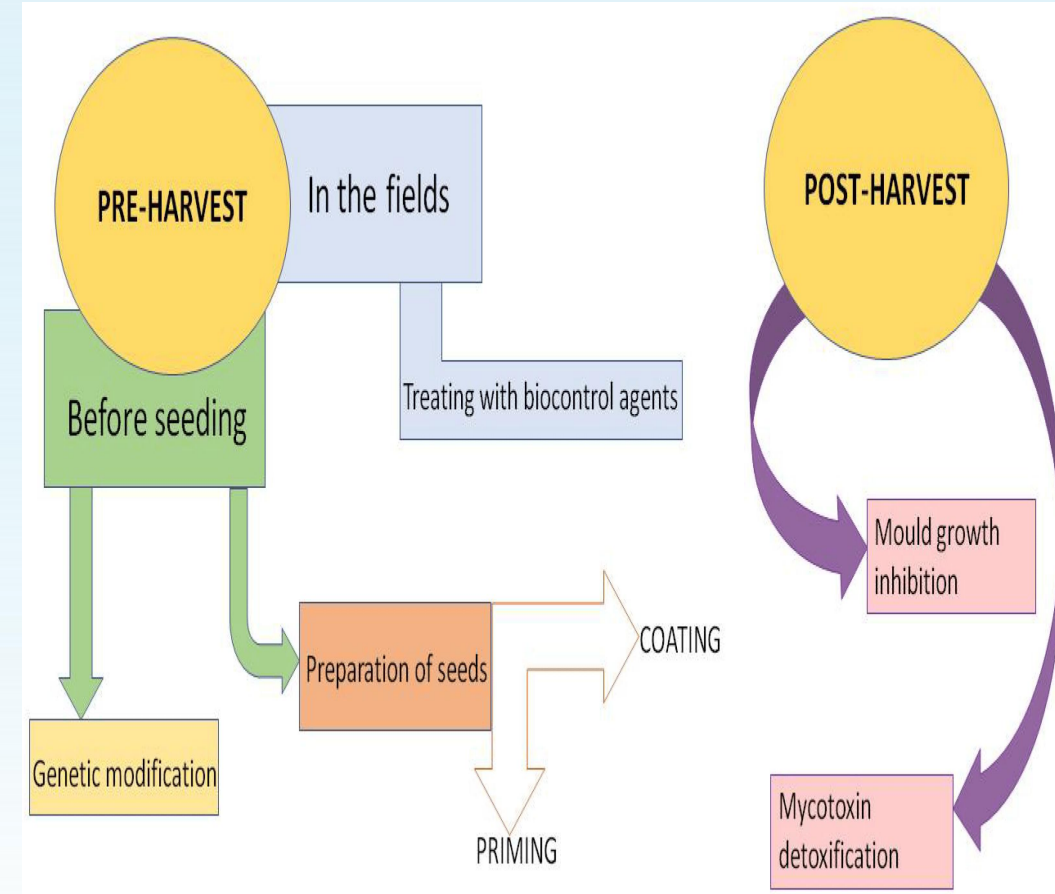


3. Pre-harvest prevention and control of *A. flavus*

- Three major ways to reduce pre-harvest *A. flavus* colonization and aflatoxin contamination identified in the studies are:-
 - ✓ resistance breeding,
 - ✓ biocontrol, and
 - ✓ good agricultural practices (GAP)
- GAP has proven to be an effective technology in the mitigation and management of aflatoxin risk under farm conditions



i) Host plant resistance

- Grow hybrid maize with promising levels of resistance to *A. flavus* and aflatoxin accumulation
- Some GMO hybrids with Bt traits may reduce aflatoxin levels because the hybrids with Bt traits are less prone to insect damage
- More resistant corn hybrids can be planted in the high-risk areas

Bt corn MON810 safer than insect damaged corn



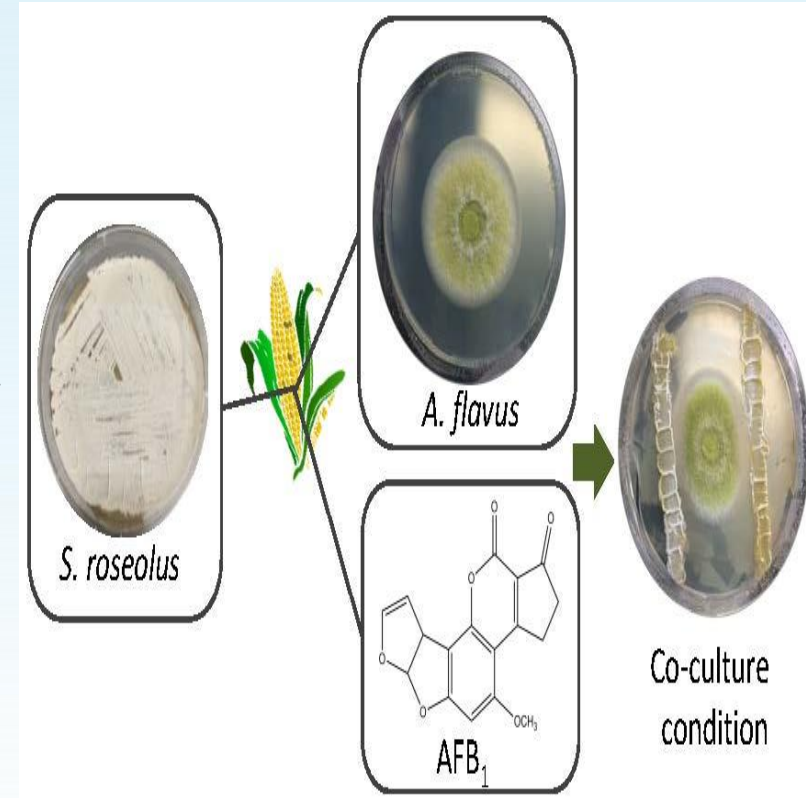
DK 818 Yieldgard

DK 818 untreated isohybrid

Bt corn	Non-Bt corn
Less mycotoxin	More mycotoxin
Less antifungal in feeds	More antifungal in feeds

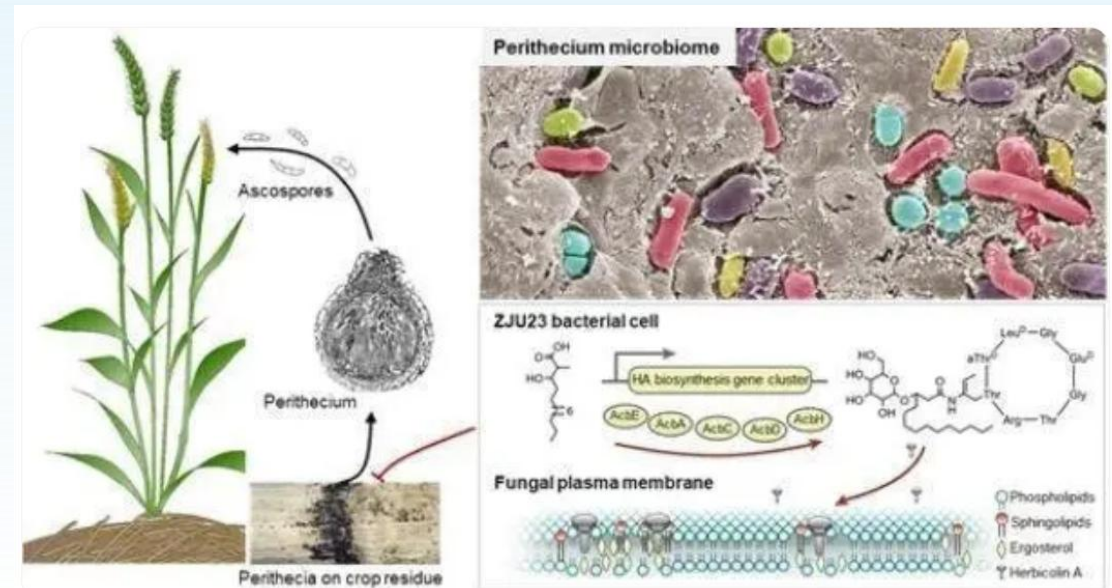
ii) Biocontrol with antagonistic strains of *A. flavus*

- The use of antagonistic isolates of *A. flavus* as biocontrol agents is a cost-effective and environmentally friendly way to reduce aflatoxin levels
- Applying and increasing the proportion of carefully selected antagonistic strains of *A. flavus* in the field can help to reduce incidences and quantities of aflatoxins in the crop
- *Bacillus* spp., *Pseudomonas* spp., and *Streptomyces* spp., among other bacterial species have demonstrated inhibitory powers against aflatoxin producers
- Studies show that it reduces aflatoxin concentrations in treated crops by >80% in both field and storage conditions. The best results are obtained when is applied prior to flowering in the field



Biological Control

- Biocontrol techniques for reducing aflatoxin contamination in corn kernels usually involve massive application of non-aflatoxigenic *A. flavus* to the soil
- Incorporating biocontrol *A. flavus* into the bioplastic seed coating resulted in a decreased percentage of aflatoxin producers in the soil isolates and Significantly lower aflatoxin contamination of harvested corn kernels.



Cont...

iii) Promotion of varieties with good attributes

Selection and promotion of varieties with good attributes e.g.

- ✓ Early maturity, drought tolerance, and
- ✓ Good ear attributes, such as closed ears, husk tightness, and closeness, good kernel characteristics, etc.

Can help to reduce the amount of aflatoxins

- During crop growth, irrigation, pest control, and nutrient management strategies could be altered depending on the risk zones



Cont....



iv) Good agricultural practices

- GAP is another approach to control *A. flavus* and aflatoxin contamination
- These include the application of appropriate crop, moisture, soil, and pest management strategies
- In agricultural practice, a possible tool to reduce *Aspergillus* infection is to apply chemical fungicides
- However, organic agriculture systems appear to be similarly or less affected than conventional systems
- It should be noted that manure facilitates the growth of microorganisms that suppress soil infections i.e., *A. flavus*



v) Crop rotation

- The continuous cultivation of maize on the same land may contribute to the build-up of toxigenic fungal populations in the soil
- This increases the risk of fungal infection and aflatoxin contamination
- Crop rotation potentially reduces the population of aflatoxin-producing fungal communities
- The efficacy of education and raising farmer awareness on-farm demonstrations of crop rotation resulted in a reduction of infections

