

PREVENTION OF AFLATOXIN CONTAMINATION OF CORN USING AF-36 OR AFLA-GUARD®

What Are These Products?

AF-36 and Afla-Guard® are commercial preparations of different strains of the fungus, *Aspergillus flavus*. Neither of these strains produce aflatoxin; thus, they are referred to as “atoxicogenic” strains. AF-36 is heat-killed wheat seed which is colonized by the fungus, but its growth is not visible (Fig. 1A). It is labeled in Texas for aflatoxin control on corn and cotton and is produced by Arizona Cotton Research and Protection Council, with Double CT LLC (Scott Averhoff (972) 351-1439 or Arleen Averhoff (972) 351-4825) as the Texas distributor. Afla-Guard® consists of hulled barley seed coated with spores of the fungus (Fig. 1B). It is labeled in Texas for aflatoxin control on corn (field, sweet, and popcorn) and peanuts. It is produced by Syngenta Crop Protection, Inc. and is available from dealers that sell their products.



Fig. 1. Initial appearance of (A) AF-36 and (B) Afla-Guard®.

How Do They Work?

First, in order for these atoxicogenic strains to work, the dormant fungus must begin to grow and reproduce, using the dead seed as a food source. The fungal growth initially present on the seed will not readily disperse into the field. However, by growing on the seed, the fungus will produce numerous spores, which will be readily released and dispersed into the field by air movement. Under optimal moisture and temperature conditions, new spores will be produced, as soon as two days after placement (Fig. 2A). Dew and moist soil favor spore production. Spores will be produced several days longer if these optimal conditions persist (Fig. 2B). However, spore production can not continue indefinitely.

Eventually, nutrients from the seed will become depleted or the seed will become colonized by other microbes.

Once the spores are moved from their origin, they may land on a corn silk. If they grow into the ear and colonize the developing seed before the arrival of any native, aflatoxin-producing strain of *Aspergillus flavus*, they will prevent colonization by these toxic strains. ***It is a competition for limited “space at the table” and whoever occupies that space first, prevails. They can not be “bumped out” from that space by their competitors.***

So the control strategy is to swamp the corn field before silking with numerous spores of the atoxicogenic strain, which greatly outnumber the native, toxin-producing strains. AF-36 is labeled for application between V7 and silking. Afla-Guard® is labeled for application between V10-V12 and silking.

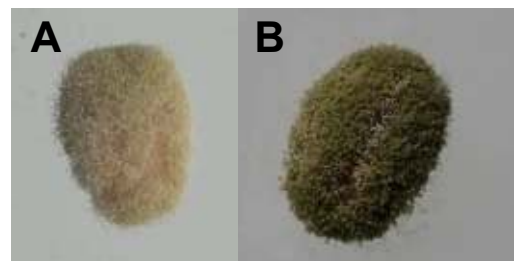


Fig. 2. Spore production of atoxicogenic *A. flavus* on seed, (A) two and (B) three days after activation by moist conditions.

How Can They Fail to Work?

Because of the time required for spore production, a late application (after silking) may not work.

The activation of the dormant fungus on seeds by moisture is essential. If the seeds are placed on dry soil, the fungus will not grow much or at all. On the other hand, if there is a heavy rain shortly after placement, the seed kernels may get buried under mud. Burial from soil cultivation will also reduce effectiveness.

The use of atoxicogenic strains has the best chance of success with irrigated corn, because soil moisture can be controlled. It may be less effective in non-irrigated corn, particularly in drought years.

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