

Aflatoxin-free transgenic maize using host-induced gene silencing**2017**

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Abstract

Aflatoxins, toxic secondary metabolites produced by some *Aspergillus* species, are a universal agricultural economic problem and a critical health issue. Despite decades of control efforts, aflatoxin contamination is responsible for a global loss of millions of tons of crops each year. We show that host-induced gene silencing is an effective method for eliminating this toxin in transgenic maize. We transformed maize plants with a kernel-specific RNA interference (RNAi) gene cassette targeting the *aflC* gene, which encodes an enzyme in the *Aspergillus* aflatoxin biosynthetic pathway. After pathogen infection, aflatoxin could not be detected in kernels from these RNAi transgenic maize plants, while toxin loads reached thousands of parts per billion in nontransgenic control kernels. A comparison of transcripts in developing aflatoxin-free transgenic kernels with those from nontransgenic kernels showed no significant differences between these two groups. These results demonstrate that small interfering RNA molecules can be used to silence aflatoxin biosynthesis in maize, providing an attractive and precise engineering strategy that could also be extended to other crops to improve food security.

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