SUMMARY
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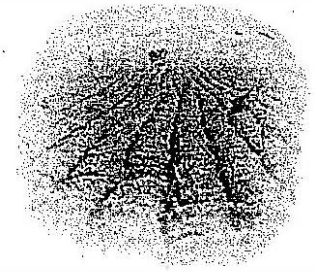
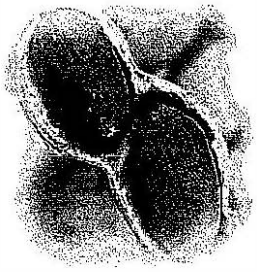
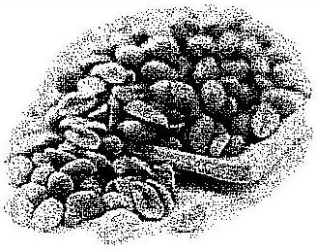

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A HACCP Based Approach for an Integrated Management of Aflatoxin Contamination in Groundnut in Gujarat, India

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Introduction

Aflatoxin contamination in rainfed agricultural production systems is a serious concern because of its adverse implications in human- and animal-health. Consequently, it has become a major issue in international trade of groundnut and its products (Bhat and Vasanthi, 1999). Stringent regulatory approach adopted by the international trade coupled with absence of proven sources of resistance has made it imperative to develop integrated management method. This paper describes such an effort of an inter-institutional collaborative research under different production systems.

Materials and methods

A Hazard Analysis Critical Control Point (HACCP) analysis of aflatoxin contamination was made and management options for critical control points were identified/developed. The options were packaged suitably and field-evaluated through on-farm trials. The package included deep summer ploughing, selection of healthy seed, seed treatment with carbendazim @ 2g kg^{-1} seed, furrow application of deoiled castor bean cake @ 500 kg ha^{-1} amended with 2.5 kg formulated *Trichoderma harzianum*, foliar spray of 5% aqueous neem seed cake extract at 40-45 DAS followed by a spray of mixture of carbendazim (0.02%) and mancozeb (0.2%)at 65-70 DAS, harvesting at right maturity (when 75% pods are matured), drying pods quickly to <9% kernel moisture and sorting and removal of discoloured pods. In all 244 on-farm trials were conducted in Gujarat during 2001-2003.

Results and discussion

The package was effective in reducing soil *A. flavus* (Af) population and seed infection, seed colonization and aflatoxin production in seed by *Af-*. During 2001, out of 36 trials, seed infection, soil Af population and aflatoxin content were reduced in 20, 24 and 28 trials, respectively. During 2002, in 18 of the 50 trials, there was a reduction in seed infection (1-80%), seed colonization (1-18%) and aflatoxin content (0.87-19.26 ppb) as against control plots. During 2003, out of 50 trials, seed infection (in 36), soil Af population (in 37) and aflatoxin content (in 41) reduced ranging from 1-10%, 1-13.8 $x10^3$ $cfu.g^{-1}$, and 0.06 to 27.4, respectively. Across the years, pod yield also increased ranging from 11.6 to 28.7%.

Conclusion

A two-pronged approach of adoption of HACCP and mapping of low aflatoxin risk areas could be a strategy to produce. This has to be coupled with a shift from present post-mortem approach of groundnut production and then deciding about its consumption, to utilization-based crop management systems.

References

Bhat, R.V. and Vashanti, S. 1999. Occurrence of aflatoxin and its economic impact on human nutrition and animal feed. The new regulations. Agriculture-et-Development 23, 50-56.