

Mycotoxin contamination on harvested commodities and innovative strategies for their detection and control

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Acta Horticulturae 1053: 123-132. (2014)

Abstract

Harvested fruit and vegetables often undergo a period of storage and shelf life, whose length can be influenced by several parameters, such as physiological properties, biotic/abiotic stresses, and final market destination. During these phases a portion of the product is lost, mainly due to fungal diseases, which are often not only of economic concern but also a threat to human and animal health due to presence of mycotoxins. Indeed, some species, primarily belonging to *Aspergillus*, *Fusarium*, *Penicillium* and *Alternaria* genera, produce secondary metabolites, mycotoxins, which pose a health risk to humans and animals. In fact, maximum permitted contents of mycotoxins in harvested commodities and derived products have been established by national and international organizations. Although in some instances mycotoxins have been shown to be toxic to competing microorganisms or plants, their biological-role has not yet been unequivocally established. Recent studies support their role as pathogenicity/virulence factors in host-pathogen interaction, so that a reduction in mycotoxin production might be relevant even from a plant disease perspective. Unfortunately, the use of traditional control measures, such as synthetic fungicides, is not always possible or effective in a postharvest setting because of restrictions on residue content and the appearance of resistant strains. Thus, the demand for alternative control means (as microbial antagonists, natural or generally regarded as safe compounds, and physical means), as well as for tools for the early detection of spoilage fungi, is increasing. In our research group, particular interest has been devoted to alternative means of control of blue mould caused by *Penicillium expansum* and consequent patulin accumulation in apples. To this purpose, the role of patulin in disease development was investigated.