

Title Forensic market pathology: Tracking the pathogen, its origin and inoculum sources in the supply chain

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Abstract

Penicillium spp. are ubiquitous saprobes, able to colonize all types of organic materials common in urban environments. *Penicillium expansum*, *P. crustosum* and *P. solitum* are pathogens of pear fruit and important in the pear export chain resulting in significant losses on export markets. In this study it was found that *P. crustosum* was the third most dominant *Penicillium* specie isolated within the supply chain particularly at distribution centres and retail facilities. The classic pathogen, *P. expansum* was found to be not as dominant in the export environment. However, it was frequently isolated from pear display trays. This is of concern since pear fruit is "physiologically stressed" at this stage of the supply chain and risk of infection is increased considerably. This pathogen was also isolated from controlled atmosphere storage facilities and in juice factories. *Penicillium brevicompactum* was the most dominant *Penicillium* specie isolated from packhouses, distribution centres and retail stores. Even though *P. brevicompactum* is not considered to be a postharvest pathogen, it has been associated with "sick building syndrome". In this study it has also been found that the aerial environments and the walls within both facilities appear to be the greatest areas of concern pertaining contamination points. According to the recommended limits for microbial contamination according to the European Union Good Manufacturing Practice for active- and passive air samples, none of these facilities comply with the standards. Data presented in this study should therefore be considered as indicators of potential cross contamination points. This information can be used to improve existing cleaning programmes and ultimately reduce postharvest decay and retain product quality.