

Postharvest Pathology

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Postharvest Pathology



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Recent Developments in Postharvest Pathology

This collection of papers includes some of the presentations given at the International Congress for Plant Pathology held in Turin in 2008 in the session with the above title. Fruit production for human consumption is an important part of the market economy. Any waste due to spoilage and pest infestation, in the field but mostly during the postharvest phase, results in significant economic losses which are more pronounced as the losses occur closer to the time of produce sale. Careful handling of perishable produce is needed for the prevention of postharvest diseases at different stages during harvesting, handling, transport and storage in order to preserve the produce high quality. The extent of postharvest losses varies markedly depending on the commodities and country and are estimated to range between 4% and 8% in countries where postharvest refrigeration facilities are well developed to 50% where these facilities are minimal. Microbial decay is one of the main factors that determine losses compromising the quality of the fresh produce. For the development of an integrated approach for decay management, cultural, preharvest, harvest, and postharvest practices should be regarded as essential components that influence the complex interaction between host, pathogen, and environmental conditions. Orchard practices including preharvest fungicide applications can also directly reduce the development of postharvest fruit decay. Among postharvest practices, postharvest fruit treatments with fungicides are the most effective means to reduce decay. Ideally, these fungicides protect the fruit from infections that occur before treatment, including quiescent infections, as well from infections that are initiated after treatment during postharvest handling, shipment, and marketing. However the wide consumption in human diet of high-quality fresh fruits and vegetables and the increased concerns for the possible toxicity of fungicide residues have lead to the development of new alternative approaches for disease control. One of the alternatives is the use of antagonist applications, either alone or in combination with physical treatments and substances generally regarded as safe. The implementation of these alternatives techniques often requires modifying currently used postharvest practices and development of new formulation for their applications.

Three chapters in this book deal with the mechanisms of host fruit and vegetable resistance. Adikaram and co-workers referred to preformed antifungal substances affecting the resistance of unripe fruits and changes in their level during fruit ripening. Mengiste and co-workers suggested that active processes related to the regulation

of cell death, plant hormone signalling and synthesis are implicated in disease resistance to necrotrophic pathogens during storage. Interestingly Yang and co-workers indicated that a variety of chemical, physical and biological elicitors may modulate inducible mechanisms of resistance.

Two chapters in this book deal with fungal pathogenicity factors and their relationship with the host response. Prusky and co-workers described an interesting mechanism used by postharvest pathogens to modulate host environment (alkalinization and acidification) leading to enhanced pathogenicity, while Gonzales-Candelas and co-workers presented the first wide transcriptome analysis of citrus fruit response to *Penicillium digitatum* infection.

Four chapters in this book deal with subjects related to disease assessments before harvest and their relation to the postharvest treatment of fruits and vegetables. Michailidis and co-workers emphasized the importance of weather and environmental conditions to pathogen infection and suggested different approaches for disease assessment which could be used to predict the incidence of postharvest diseases. Teixido and co-workers suggested the importance of preharvest applications of biocontrol treatment efficacy in combination with nutrients and conclude on the importance of preharvest treatment in postharvest disease control. The other two chapters dealt specifically on the new development of postharvest edible crop in the United States by Adaskaveg and Förster, and in Europe by Mari and co-workers. Both suggested that integrations of combined technologies such as sanitation and use of fungicides, physical and biological agents are of high importance.

Three chapters in this book are dealing with biological control of postharvest diseases and host responses to the biocontrol agents. Janisiewicz, presented a summary of the biocontrol developments in his “Quo Vadis of Biological Control ...” chapter and their impact on the industry, while Usall and co-workers described the different technological changes made during the development of new formulations which allow the improvement of biocontrol efficiency. Castoria and Wright referred in their chapter to the different mechanisms of perception and activation of host resistance by the biocontrol agents.

The remaining chapters of the book are focused in specific study cases of crops such as kiwifruit, peaches and grapes, where the integrations of different approaches at the pre and postharvest levels are combined. These represent new types of presentations which were presented in the evening workshops of the ISPP program with excellent attendance. Manning and Beresford described how management and assessment of rot-risk-factors in the vine and storage conditions may allow prevention of botrytis problems. Melgarejo and co-workers described the importance of orchard management in combination with epidemiological assessment to predict risk and optimal handling of fruits.

In summary the Postharvest Pathology sessions included excellent presentations of new and exciting progress at the leading edge of Postharvest Pathology.

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