**Title** Innovations in storage technology and postharvest science

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**Citation** Abstracts of 7th International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012. Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.

**Keywords** packaging; postharvest science; storage

**Abstract**

In recent years several improvements have been made in storage technologies and the postharvest manipulations of horticultural produce in order to reduce losses, maintain taste and nutritional properties, and enhance market value. Besides these main goals, innovations are also aimed at increasing the sustainability of postharvest technologies. This can be accomplished through a more rational use of energy and the reduction of chemicals, as well as by decreasing the amount of standard packaging and the use of environmentally- friendly or recyclable material. Although improved technologies are already being used in storage facilities and commercial applications, others are still at a preliminary or pilot-scale level and currently under evaluation. Some innovations in postharvest technology deal with the modulation of gas composition in storage rooms and/or packaging, in particular concerning oxygen levels, which for some long-term storage protocols and crops, is set at concentrations as low as 0.4-0.8%. Coupling such extreme conditions with the modulation of other storage parameters is an attractive approach: the possibility of maintaining a higher temperature when the storage room (or packaging) atmosphere composition is altered and/or specific compounds (e.g. ethylene inhibitors) are present is of great interest. The application of short-term postharvest stresses for limited storage periods or for inducing metabolic and compositional changes, the use of new material for packaging (including minimally processed produce), and the set-up of alternatives to the use of chemicals are other issues where innovative approaches are being proposed. Improved technology based on the combination of different factors and the understanding of their roles in modulating metabolic responses also requires innovation in applied and basic research protocols and approaches. The genomics (or post-genomics) era and development of high-throughput 'omics' techniques are thus fundamental to fully understand postharvest phenomena and evaluate the effects and the efficacy of the improved technologies in terms of "systems". Transcript profiling data of produce undergoing postharvest treatments has recently started in different crops, thus providing useful and novel information on specific processes and regulatory mechanisms. Implementation of these data and their integration with proteomics, metabolomics and other phenotyping platforms represent one of the advanced frontiers of research in postharvest science.