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### **Abstract**

The postharvest industry is committed to deliver high quality, safe and nutritious products to the consumer. Any commodity that reaches the consumer has been exposed to a series of different processes. For instance, after harvesting and during handling, horticultural crops are constantly exposed to mechanical stresses that induce different cellular responses. In addition, different strategies are followed to extend the shelf life such as temperature reduction, and change in air atmosphere composition. All these strategies taken to preserve quality and at the same time to offer a safe and nutritive food are product specific and not fail-safe. Stressful conditions alter homeostasis in live products revealed by protein changes (e.g., levels, structure and conformation, post translational modifications) leading in many cases to the appearance of physiological disorders. There is need to understand and gain deeper insight into the responses to specific processes at the biochemical level in order to further improve postharvest processing strategies and offer high quality and safe products which satisfy the consumer requirements. High throughput approaches such as the use of proteomics is a powerful tool for the postharvest industry in terms of process optimization, quality, biological aspects: protein structure and protein function. Proteomics approaches have a large potential for postharvest industrial applications. However, there are still some pitfalls associated with the techniques themselves and how to deal best with the tremendous amount of data they generate. This review will cover these issues and other challenges to be faced and will pay special attention on current and potential postharvest applications.