
Editorial: What is next in postharvest technology?

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1 Introduction

The goals of postharvest technology are often summarised as follows: to maintain quality and safety, reduce losses and waste, and add value to harvested produce. This requires good understanding of the produce (plant or animal material) physiology, pre and postharvest, and the responses of produce to postharvest handling environment along the supply chain, including treatments. Often, the utility of the produce is assessed based on a combination of sensory quality attributes, absence of diseases and disorders, and safety. However, price and knowledge of the produce, including utility experience, become important cues affecting consumer willingness to purchase. To meet these objectives, advances in our understanding of respiratory patterns and biochemical pathways that lead to produce maturity, ripening and senescence were uncovered in the early phases of postharvest knowledge development.

Postharvest treatments, such as calcium dips, to maintain quality and reduce the incidence of disorders, and others, such as 1-MCP, to control ripening, were developed and commercialised. Refrigeration technology has continued to play a vital role in maintaining the cold chain and quality of fresh produce and protocols have been developed and continue to be refined, as new knowledge emerges, to extend storage and marketing window. Developments in packaging technology, from ventilated packaging for bulk handling and shipping, to modified atmosphere packaging for retail and consumer handling of whole and fresh-cut produce have revolutionised the way, where, when and how we eat fresh produce, thereby, making the convenience enjoyed by today's consumer the fantasy of those of recent past. It is not uncommon to see multi-lane packhouses equipped with latest sensor technologies and automation for defects identification and segregation of produce based on external and internal quality attributes. For durables, drying, for instance, has evolved from open air drying, to the use of highly instrumented flat and deep bed dryers, including microwave and other technologies for controlled moisture removal in foods. Today, the year-round availability of fresh and processed food products from tropical, sub-tropical and temperate climates are now taken for granted in most urban areas, thanks to these and many more pioneering technological advances in postharvest management that are too numerous to mention.

2 Delivering more food with less – the challenge of postharvest technology

Despite the tremendous advances in the way we harvest, handle and process fresh and durable food commodities, food insecurity remains a challenge in the global food system. The problem is complex, ranging from technological to socio-economic. However, it is generally agreed that our food system needs to become more sustainable and efficient in the use of available resources. In the production area, the call has been made for 'more crop per drop', referring generally to the urgent need for a new wave of productivity enhancing technologies in high-yielding and disease resistant planting materials, irrigation, fertilisation, mechanisation and automation. In postharvest arena, high incidence of losses (mainly in developing countries) and waste (mainly in developed countries) continue to subvert efforts at increasing food availability and access. To date, there are still no standardised methods and critical limits to evaluate this wastage. While many technologies exist for commercial application in large-scale operations, small to medium scale operators, especially in transition economies, continue to lack cost-effective solutions to meet their needs. As global appetite for new (and exciting) tropical food products (especially fruit and vegetables) continues to blossom, the postharvest knowledge gap needed to transform them into profitable economic value chains remains lacking, hence, limiting their exploitation. Recent advances in biotechnology, nanotechnology and communication networks offer new opportunities for a new wave of technologies to shatter existing ceilings on storage and shelf life, and reduce energy and water demand, without leading to unacceptable impacts on quality, safety and nutritional value. In fact, these new emerging technologies may also be harnessed to enhance flavour and consumer appetite for foods, which could promote increased consumption of fruit and vegetables for better health outcomes, and reduce the increasing health burden in developing countries associated with microbiological contamination of durable food crops.

While the world ponders how to feed 9 billion people by 2050 using existing agricultural resources or even less, postharvest technology has important role to play in ensuring the availability and access to sufficient food for all without resorting to more cultivation. To achieve this goal, new technological breakthroughs are needed to extend and deepen our understanding of how food materials respond to environment stresses, including the fate of biochemical metabolites in fresh and processed food that underpin human nutrition and health. The articles contained in this issue of *IJPTI* demonstrate some of the opportunities to conserve food products through better understanding of the effects of maturity and storage, application of postharvest treatments such as calcium dips, 1-MCP, modified atmosphere packaging, hot water, and pressure, among others. During the past 50 years, major strides have been made that have resulted in better postharvest handling and management of food to reduce losses, promote value addition, and enhance food security. The urgent need for more food with less calls for a radical rethink about new ways to reduce losses and waste as vital productivity enhancing measures. Greater collaboration and networking, among research laboratories and with the private sector, is needed to advance this important cause.