Editorial: Postharvest – proposal to standardise the terminology

Umezuruike Linus Opara

Faculty of AgriSciences,
Stellenbosch University,
Private Bag X1, Stellenbosch 7602, South Africa
Fax: +27-21-808-3743
E-mail: opara@sun.ac.za

1 Introduction

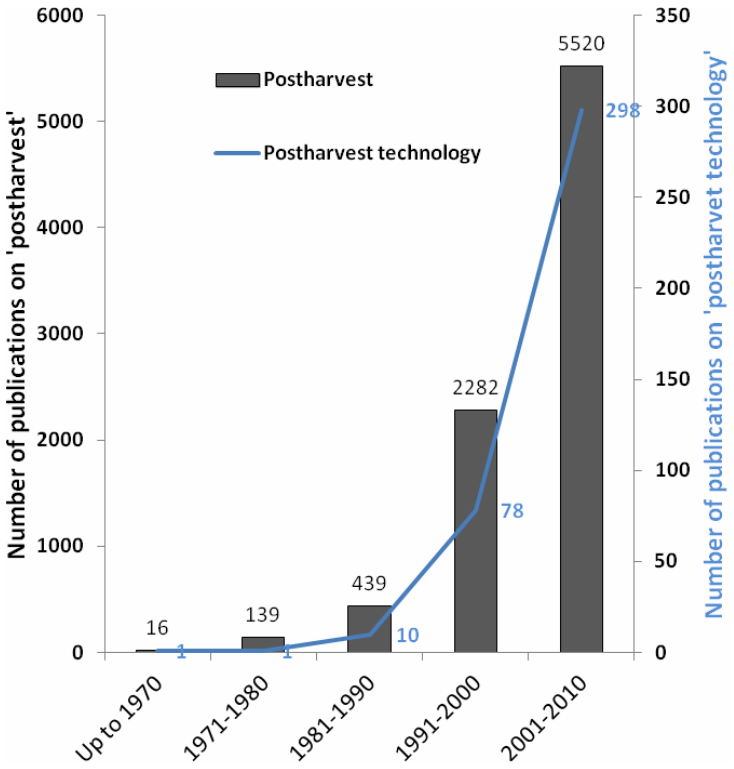
During the past 50 years, improvements in post-farm gate activities have been recognised as equally important as improvements in on-farm production of crops and animals in assuring food and nutrition security. The global food and energy crises of the early 1970s led to the realisation of the need to reduce the high incidence of postharvest food losses, especially cereal grains in developing countries. In response to a United Nations (UN) General Assembly resolution, the Food and Agriculture Organisation (FAO) of the UN implemented a special programme on reducing postharvest losses. At the same time, many countries, research and academic institutions also developed new programmes on postharvest education, research and extension, and training. In many developed countries, new research and training programmes on postharvest technology were developed at various universities and specialised institutes to promote the development and application of new knowledge to reduce food losses and waste. Today, many universities in Asia and Africa offer undergraduate and postgraduate degrees in postharvest technology or variants of the title.

Concomitant with the rise in postharvest research and human capacity building was the rise in postharvest research outputs during the past 40 years. Between 1970 and 2010, the number of 'postharvest' and 'postharvest technology' articles in the Web of Science increased significantly by 34,400% and 29,700%, respectively (Figure 1). In 1991, the first peer-reviewed international scientific journal dedicated to postharvest research was launched – *Postharvest Biology and Technology* (PBT). This was followed by the publication of the inaugural issue of the *International Journal of Postharvest Technology and Innovation* (IJPTI) in 2006. In the 1990s, Washington State University in the USA briefly published the '*Tree Fruit Postharvest Journal*'. The above three journals used the word 'postharvest' in their names. Similarly, key textbooks on various aspects of postharvest science have the word 'postharvest' in their titles. These include 'Postharvest technology of horticultural crops' (A.A. Kader, Ed., 2002, UC Davis, USA), 'Postharvest physiology of perishable plant products (S.J. Kays, 1991, Van Nostrand Reinhold, USA), 'Postharvest handling: a systems approach (W.J. Florkowski et al. (Eds.), 2009, Academic Press (Elsevier), San Diego, CA, USA), 'Postharvest – an introduction to the physiology and handling of fruit, vegetables and ornamentals (R.B.H. Wills et al., 2007,

CAB International, Wallingford, UK), and 'Postharvest technology of fruit and vegetables' (A.K. Thompson, 1996, Iowa State Press, USA). It is also noted that a few authors have used the word 'post-harvest' in their book titles such as 'Crop post-harvest: science and technology: perishables' (D. Rees, et al. (Eds.), 2012, Blackwell Publishing Ltd., West Sussex, UK) and 'Crop post-harvest: science and technology' (P. Golob et al. (Eds.), Blackwell Publishing and the Natural Resources Institute (NRI), University of Greenwich, UK).

A rise in the number of new academic programmes and research publications on a subject matter often signals the evolution and emergence of a new discipline. Such was the case of agricultural engineering in the early part of the 20th century, beginning in the USA. Historically, postharvest research and education programmes originated in the plant sciences from the fusion of agricultural science and engineering technology; hence, the emergence of terminologies such as 'postharvest biology', 'postharvest physiology', 'postharvest engineering', and 'postharvest technology'. Among these, the term or phrase 'postharvest technology' is the most widely used across disciplines and industry.

Figure 1 Increase in scientific publications with 'postharvest' and 'postharvest technology' during the past 40 years (see online version for colours)



Source: Web of Science

Over the years, researchers and the general public have used different words and their variants to describe or represent the activities that occur after an agricultural material has been harvested and until it reaches the end-user. These include off farm, off-farm, post farm-gate, post-farm gate, postproduction, post-production, post production, postharvest,

post-harvest, and post harvest. Among researchers in agricultural science and engineering, the following three words predominate: postharvest, post-harvest and post harvest. As the body of knowledge grows in this important area leading to the emergence of a new discipline, we believe there is a need to standardise the terminology.

A quick search of the peer-reviewed and general literature on the frequency of use of 'postharvest, 'post-harvest' and 'post harvest' showed some interesting patterns (Table 1). In PBT, 'postharvest' (2,928 results) was the most commonly used among researchers. A search of Google showed that 'post-harvest' gave the highest results (72,400,000), while 'post harvest' gave the highest search results in Google Scholar (1,310,000) and Science Direct (60,218), respectively. Considering PBT as the foremost journal on the subject matter, these search results suggest that the word 'postharvest' is the most commonly used by experts in the field. This corroborates the fact that most key textbooks and peer-reviewed journals on the subject matter used the word 'postharvest' in their titles. These are the reasons why the word 'postharvest' is hereby proposed to the *scientific community* as the standard terminology used to describe the operations that occur from the point of harvest until the fresh or processed product reaches the end-user. We encourage authors submitting their new articles to *IJPTI* to use the word 'postharvest' instead of its variants 'post-harvest' and 'post harvest'.

Table 1 Search results for 'postharvest', 'post-harvest' and 'post harvest' on World Wide Web (10 May 2013)

Terminology	*Google*	*Google scholar*	*Science Direct*	*PBT*
Postharvest	2,210,100	287,000	12,849	2,928
Post-harvest	72,400,000	198,000	60,218	999
Post harvest	72,000,000	1,310,000	60,218	999

The peer-reviewed articles included in this issue of *IJPTI* highlight some of the ongoing research in innovative postharvest technology at universities and other knowledge institutions around the world seeking to enhance food and nutrition security. The average large number of co-authors per paper (> 5), ranging from two to eight, highlights increasing trends for more collaboration and cooperation among researchers, institutions and across locations, working together to find cost-effective and lasting solutions to the problems facing the human food system. For instance, Macheka et al. present an overview of the banana supply chain in Zimbabwe by identifying the causes of mechanical damage and the critical control points in the fruit supply chain, while Koledoye and Akanbi examined the dehulling and softening of locust bean seeds prior to fermentation for the production of a traditional product. The paper by da Silva et al. examined the stability of *Lactobacillus acidophilus* and *Lactobacillus rhamnosus* in minimally processed cabbage while Pilon et al. showed that anti-browning solutions and chitosan-based edible coating can maintain the quality of fresh-cut apple over a period of time. Similar studies by Chaves et al. found that antioxidant agents affected the sensorial acceptance and physicochemical characteristics of minimally processed orange. Research by Picard et al. using chitosan-based coatings containing peppermint essential oil on papaya demonstrated that fruit postharvest quality can be maintained. There has been growing interest among researchers and the general public on the effects of postharvest management on the nutrition quality of foods, and also in linking fruit and vegetable consumption to better health outcomes, including the extraction of bioactive compounds

from the edible and non-edible (waste) fractions. As part of their contribution to the body of literature in this area, Varzaka evaluated the antioxidant capacity and flavonoid content of citrus peels and found that citrus may be a good source of valuable bioactive compounds.

This collection of papers ranging from postharvest handling to agro-processing, preservation and extraction of bioactive compounds for value adding purposes reflects the vision of *IJPTI* to share the latest technological advances and innovation in postharvest technology of food and agro-industrial materials. We welcome readers, postharvest researchers, practitioners and policy experts to submit their articles demonstrating the development and application of postharvest technology to maintain quality and safety, reduce losses and waste, and add value to agricultural, horticultural, seafood products and other biomaterials.