Chapter 9

A Study on Technology–LED Solutions for Fruit Grading to Address Post–Harvest Handling Issues of Horticultural Crops

Arun Kumar R.
KLS Gogte Institute of Technology, India

Vijay S. Rajpurohit
KLS Gogte Institute of Technology, India

Sandeep Kautish
LBEF Campus, Nepal

ABSTRACT

The reduction of post-harvest losses and value addition of the horticultural corps has attained the higher priority of the current research works. Grading is the major phase in post-harvest handling. Presently grading is done on the basis of observation and through experience. Various drawbacks associated with such manual grading are subjectivity, tediousness, labor requirements, availability, inconsistency, etc. Such problems can be alleviated by incorporating automation in the process. Researchers round the clock are working towards the development of technology-driven solutions in order to grade/sort/classify various agricultural and horticultural produce. With the motto of helping the researchers in the field of grading and quality assessment of fruits and other horticulture products, the present work endeavors the following major contributions: (1) a precise and comprehensive review on technology-driven solutions for grading/sorting/classification of fruits, (2) major research gaps addressed by the researchers, and (3) research gaps to be addressed.

DOI: 10.4018/978-1-5225-9632-5.ch009
1. INTRODUCTION

Horticulture, the branch of agriculture, can be defined as the science and art of cultivating and marketing fruits, vegetables, flowers, nuts and ornamental plants. The word horticulture can be split into two Latin words viz. *hortus*, meaning ‘garden’ and *cultus*, meaning ‘tilling’. Horticulture can be distinguished from that of agriculture by its scale of production and commercialization. Horticulturists usually apply their skills and technologies to cultivate intensively produced plants for human food purposes and allied social needs. Horticultural produce imparts a vital part in human nutrition as they supply the necessary vitamins, minerals, dietary fiber and anti-oxidants. Horticulture sector has become one of the major drivers of the growth in the agriculture sector (Horticulture Statistics Division, 2017).

At its widest scale, post-harvest horticulture involves transformation of the product from the state it is disjointed from the plant or growing medium to the state of ready-to-consume by the end consumer. The field of post-harvest includes various stages / states / processes such as cleaning, sorting, grading, removal of field-heat, waxing, packing, storage and transportation. Irrespective of the scale or complexity, post-harvest activities add ‘value’ to the product (Collins, R. J., 2009).

Among all the post-harvest handling processes, sorting and grading plays a vital role. This is because of the reason that the sorting and / or grading is the stage that actually involves endeavoring the true market value of the commodity.

The quality and safety of the horticulture products that reach the end consumer hinges due to poor practices of post-harvest management. Both qualitative and quantitative losses ensue in horticultural commodities in between the harvest and the consumption. The quantitative losses are easy to assess. But the qualitative losses are difficult to assess as they include the aspects such as caloric value, edibility, consumer acceptability, nutritional quality etc. Moreover, the quality standards and consumer preferences differ prominently across countries and across cultures. These differences in turn affect marketability and the extent of post-harvest losses. Post-harvest losses fluctuate greatly depending on the type of commodity, production areas and the production season.

Reduction of the post-harvest losses has many benefits. Few of them are as under (Department of Horticulture, 2014):

1.  It can surge the food availability to the growing population of the world.
2.  Improves food security and imparts better nutrition to the consumers.
3.  Reduction of the losses reduces the area needed for production.
4.  Reducing post-harvest losses also conserves natural resources.
5.  Boosts up the financial stability of the growers / farmers.
7.  Helps to uplift the financial growth of the country.

The present article is organized as follows. Section 2 discusses about fruits and their importance in general. Various issues of post-harvest handling with respect to grading of fruits are discussed in section 3. Section 4 throws light on the importance of incorporating technology in addressing the post-harvest issues as mentioned in section 3. Section 5 discusses in detail about the available literature in connection to solving the post-harvest handling issues with respect to grading of fruit with technology driven solutions. Section 6 discusses the major issues being addressed and section 7 discusses the issues and research gaps to be addressed. Finally, the chapter is concluded in section 8.
Related Content

An Approach for Land-Use Suitability Assessment Using Decision Support Systems, AHP and GIS
[www.igi-global.com/chapter/approach-land-use-suitability-assessment/60604?camid=4v1a](www.igi-global.com/chapter/approach-land-use-suitability-assessment/60604?camid=4v1a)

Examination of Mobile Social Networking Service (SNS) Users’ Loyalty: A Structural Approach
[www.igi-global.com/article/examination-of-mobile-social-networking-service-sns-users-loyalty/158083?camid=4v1a](www.igi-global.com/article/examination-of-mobile-social-networking-service-sns-users-loyalty/158083?camid=4v1a)

Romanian Agriculture Funding: Approaches Regarding the Funding in Romanian Agriculture After EU Integration
[www.igi-global.com/chapter/romanian-agriculture-funding/210020?camid=4v1a](www.igi-global.com/chapter/romanian-agriculture-funding/210020?camid=4v1a)

Use of Artificial Neural Network for the Construction of Lorenz Curve