



## A Review

### Article history :

Received : 21.01.2013

Revised : 01.04.2013

Accepted : 01.05.2013

# Image processing for quality and safety control in Horticultural industries

■ QURAAZAH AKEEMU AMIN, HAFIZA AHSAN<sup>1</sup>, TOWSEEF AHMAD WANI<sup>1</sup>, NUZHAT QUADIR<sup>2</sup>, SHAIQ AFZAL<sup>1</sup>, MUNAZAH MEHRAJ<sup>1</sup> AND HARLEEN KOUR<sup>3</sup>

### Members of the Research Forum

#### Associated Authors:

<sup>1</sup>Division of Post Harvest Technology, Sher-e-Kashmir University of Agricultural Sciences and Technology (K), SRINAGAR (J&K) INDIA

<sup>2</sup>P.G. Department of Food Technology, Institute of Home Science, University of Kashmir, SRINAGAR (J&K) INDIA

<sup>3</sup>Division of Food Technology, Sher-e-Kashmir University of Agricultural Sciences and Technology (K), SRINAGAR (J&K) INDIA

#### Author for correspondence :

**QURAAZAH AKEEMU AMIN**

Division of Post Harvest Technology, Sher-e-Kashmir University of Agricultural Sciences and Technology (K), SRINAGAR (J&K) INDIA

**ABSTRACT :** The beginning of image processing was developed in the late 1940's with initial research into artificial intelligence (Sun, 2000). The basic components of an image processing system consist of image acquisition devices, a computer and operating software. The process begins by illuminating the object with the lighting. The optics then couples the image to the camera sensor. The camera then converts the image from optical to analog or digital so that it can be understood by the computer. The computer, in combination with the imaging software and hardware, can then process the image (Aguilera and Briones, 2005). There are many imaging techniques used in quality and safety detection of food e.g. Gamma ray imaging, X- Ray imaging, Ultraviolet imaging, Near Infra Red imaging, Microwave Band imaging and Hyper-spectral imaging (Bato *et al.*, 2000). All these techniques work on the principle of optics *i.e.* the interaction of the light and the matter. It has extreme important applications in agri-horticultural industries. It has revolutionized our post harvest industries and its quality inspection laboratories (Marbach, 2002). Quality is a very important characteristic for food acceptability to a consumer. In fruit and vegetable industries image processing helps us to detect the damage, bruises or any microbial growth which may not be easily visible to the eye. Moreover the grading and sorting can also be done properly with this technique. The maturity of the fruits and vegetables can be accessed prior to the human detection without damaging them (Arman *et al.*, 2011).

**KEY WORDS :** Computer vision, Hyperspectral Imaging , Image processing, Machine vision, Quality, Safety

**HOW TO CITE THIS ARTICLE :** Amin, Quraazah Akeemu, Ahsan, Hafiza, Wani, Towseef Ahmad, Quadir, Nuzhat, Afzal, Shaiq, Mehraj, Munazah and Kour, Harleen (2013). Image processing for quality and safety control in Horti-agricultural industries, *Asian J. Hort.*, 8(1) : 364-373.

The increased awareness and sophistication of consumers have created the expectation for improved quality in consumer horticultural fresh and processed products. This in turn has increased the need for enhanced quality monitoring. Quality itself is defined as the sum of all those attributes which can lead to the production of products acceptable to the consumer when they are combined. Quality has been the subject of a large number of studies (Shewfelt and Bruckner, 2000). Together with the high labour costs, inconsistency and variability associated with human inspection accentuates the need for objective measurements systems. Recently automatic inspection systems, mainly based on camera computer technology have been investigated for

the sensory analysis of horticultural products. This system known as computer vision has proven to be successful for objective measurement of various horticultural products (Sun, 2000; Wang and Sun, 2001). As a result automated visual inspection is undergoing substantial growth in the fruit and vegetable processing industries because of its cost effectiveness, consistency, superior speed and accuracy. Traditional visual quality inspection performed by human inspectors has the potential to be replaced by computer vision systems for many tasks. There is increasing evidence that machine vision is being adopted at commercial level (Locht *et al.*, 1997). Machine vision involves the image processing technology. Images are the most common and convenient