



Review

Application and potential of backscattering imaging techniques in agricultural and food processing – A review



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ABSTRACT

This review covers the application of backscattering imaging as a non-invasive technique for monitoring the quality of agricultural and food products. The review enumerates and discusses the concepts and various applications of laser light backscattering imaging (LLBI), multispectral laser backscattering imaging (MBI) and hyperspectral laser backscattering imaging (HBI). All the methods make use of laser light which varies in spectrum from visible up to near-infrared to detect changes in the quality of fresh produce. Emphasis is placed on applications which demonstrate promising potential for agricultural and food applications under various conditions. A critical review of the limitations is also given.

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1. Introduction

The increasing demand for agricultural and food commodities has brought about the adoption of automation and modern techniques to increase the rate of production, improve quality assessment and reduce waste. The increasing rate of international trade has imposed a high-level of standardisation in terms of quality and

safety of these commodities among the countries involved (Greensill and Newman, 1999). The various handling stages and processes to which these commodities are subjected, including environmental conditions, affects their quality. It is therefore important to monitor and control the quality of these commodities to ensure that they adhere to a defined set of quality criteria or to meet consumer requirements (Ruiz-Altisent et al., 2010).

The quality index of agricultural and food commodities comprises attributes which facilitate their acceptance or rejection by the consumer (Singhal et al., 1997). Choi et al. (2006) reported the use of appearance, texture, nutritional content, flavour, and defects

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