



Spectral imaging application for quality and safety measurement for agricultural materials

Abstract

Food quality and safety, commonplace throughout human history, remains a concern today, with several notable instances involving the agro-food industry. Recent food safety incidents and public health concern related to detrimental food additive issues have driven the need to develop fast, sensitive, and reliable methods to detect food hazards, adulteration and degradation. Here, we assess the applicability of line-scan spectral imaging technique for quality and safety measurement of various food and agricultural materials. In this presentation, the characteristics and applications of spectral imaging techniques, along with the major barriers and limitations, are discussed, with an emphasis on the treatment of spectral data. Spectral imaging techniques have potential to fulfill the industrial need for quality and safety analysis of food and agricultural materials, however, still requires measurement accessories and dynamic chemometric analytical methods for modern inspection. We believe this discussion will be an effective guide for food and agricultural industry researchers and engineers to aid in the selection of spectral imaging methods to measure quality and safety parameters of food and agricultural products.

Professor Byoung-Kwan Cho
Department of Biosystems Machinery Engineering,
Chungnam National University, South Korea



RESEARCH AREAS AND EXPERTISE

- General area: Nondestructive Sensing
- Specific area: Spectral imaging and Biosensing

AWARDS AND RECOGNITION

- Minister Award of Agriculture, Food & Rural Affairs, The Korean Government, 2022
- Commissioner Award of Korea Disease Control & Prevention Agency (KDCA), 2022
- Excellence Research Award, Chungnam National University, 2023, 2022, 2020, 2019, 2015, 2014
- Hwanong Award, The Hwanong Foundation, 2020
- Academic Excellence Award, Korean Society for Agricultural Machinery, 2018

Dr. Byoung-Kwan Cho is a professor of Department of Biosystems Machinery Engineering & Department of Smart Agriculture Systems in Chungnam National University (CNU), South Korea. He is leading a Nondestructive Biosensing Group at CNU working in the area of non-destructive measurement for quality and safety of food and agricultural materials. Prof. Cho received his B.S., and M.S. degrees in Department of Agricultural Engineering at Seoul National University, South Korea, in 1993 and 1998, respectively, and received Ph.D. in Department of Agricultural and Biological Engineering from the Pennsylvania State University, University Park, USA in 2003. He joined Department of Agricultural and Biological Engineering at Purdue University, West Lafayette, USA in 2003 and, USDA-ARS, Beltsville, USA in 2005 as a post-doctoral researcher. Since 2006, he has been a professor in the Department of Biosystems Machinery Engineering at CNU. His current research focuses on the application of spectroscopic and hyperspectral imaging techniques for the system development of real-time quality and safety inspection for food and agricultural materials. Now he is serving as an Editor-in-Chief of Journal of Biosystems Engineering, and is (co-)author of 200+ peer reviewed journal articles and 5 book chapters. His research efforts in the fields of spectroscopic analysis, hyperspectral imaging and agricultural sorting system have resulted in 20+ patent registration so far.