Recent Applications of Multispectral Imaging for Seed Phenotyping and Quality Monitoring – an Overview

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Résumé en anglais	As a synergistic integration between spectroscopy and imaging technologies, spectral imaging modalities have been emerged to tackle quality evaluation dilemmas by proposing different designs with effective and practical applications in food and agriculture. With the advantage of acquiring spatio-spectral data across a wide range of the electromagnetic spectrum, the state-of-the-art multispectral imaging in tandem with different multivariate chemometric analysis scenarios has been successfully implemented not only for food quality and safety control purposes, but also in dealing with critical research challenges in seed science and technology. This paper will shed some light on the fundamental configuration of the systems and give a birds-eye view of all recent approaches in the acquisition, processing and reproduction of multispectral images for various applications in seed quality assessment and seed phenotyping issues. This review article continues from where earlier review papers stopped but it only focused on fully-operated multispectral imaging systems for quality assessment of different sorts of seeds. Thence, the review comprehensively highlights research attempts devoted to real implementations of only fully-operated multispectral imaging systems and does not consider those ones that just utilized some key wavelengths extracted from hyperspectral data analyses without building independent multispectral imaging systems. This makes this article the first attempt in briefing all published papers in multispectral imaging applications in seed phenotyping and quality monitoring by providing some examples and research results in characterizing physicochemical quality traits, predicting physiological parameters, detection of defect, pest infestation and seed health.

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