

Optical imaging techniques for rice diseases detection: a review

ABSTRACT

Rice diseases have caused great economic losses to farmers in rice cultivation. The current assessment of rice disease evaluation still relies on manual, subjective, and laborious techniques. The manual and subjective evaluations lead to uncertainties since some diseases have almost similar characterisation. The applications of immunological, molecular, and microscope techniques are time-consuming, costly, and skills dependent. Thus, optical techniques are recommended to facilitate the control of diseases through their feasibility, rapidity, and accuracy, which can lead to better management strategies, besides improving production activity. These techniques for detecting and monitoring the diseases are important for precaution and prevention action. The present review discusses the existing and potential optical techniques for the detection of rice diseases. The techniques include optical imaging that consists of computer vision, spectroscopy, multispectral imaging, hyperspectral imaging (HSI), and remote sensing. Thus, this work presents in-depth information related to the nondestructive and potential applications of optical imaging techniques for rice disease detection.

Keyword: Computer vision; Rice diseases; Image processing; Hyperspectral imaging; Near-infrared spectroscopy; Remote sensing