

Use of reflectance spectroscopy as a tool for screening viroid-inoculated oil palm seedlings

ABSTRACT

Reflectance spectroscopy was assessed as a new diagnostic tool for screening oil palm (*Elaeis guineensis* Jacq.) seedlings inoculated with Coconut cadang-cadang viroid (CCCVd). This study was aimed at non-destructive diagnosis of Orange Spotting (OS) disease of oil palm under glasshouse conditions. Leaf reflectance (in the detection range of 325-1075 nm) was acquired from oil palm seedlings with and without inoculation (control) of CCCVd. Spectral reflectance was measured at 15 and 30 days after inoculation using a non-imaging spectroradiometer, ASD FieldSpec® HandHeld™ 2. The red-edge region (680-780 nm) was investigated, and two spectral bands (i.e. 680 nm and 754 nm) were selected. Reflectance Sensitivity (RS) analysis was performed over these spectral bands. The far red band at 680 nm was found to be markedly sensitive to CCCVd infection while the spectral band at 754 nm was found to be insensitive. The 680 nm band gave an RS of 35.4% while the 754 nm band registered an RS of -5%. This study demonstrates the potential of screening CCCVd infection at an early stage (nursery establishment) non-destructively.

Keyword: Reflectance spectroscopy; Viroids; CCCVd; Orange spotting; Early detection