

## **EFFECTS OF DIFFERENT WATERING REGIMES ON FOLIAR SPECTRAL REFLECTANCE AND CHLOROPHYLL CONTENT OF *Jatropha curcas* Linn.**

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### **ABSTRACT**

*The influence of high and reduced water availability on the changes in foliar spectral reflectance and chlorophyll of *J. curcas* were investigated. The field experiment conducted was based on a completely randomized design (CRD) with four treatments replicated three times. Each replicate consisted of two plants with a total of 24 plants altogether. Treatments were: (i) Rainfed (W0) – plants were watered at field capacity  $\geq -0.03$  MPa, (ii) Mild water stress (W1) – watering was carried out to maintain soil water potential between -0.30 and -0.10 MPa, (iii) Moderate water stress (W2) – watering was carried out to maintain soil water potential between -1.0 and -0.8 MPa, and (iv) extreme water stress (W3) – plants were grown at soil permanent wilt point  $\leq -1.50$  MPa. The well-watered plants responded by showing significantly ( $p < 0.05$ ) better height growth. Result shows mean reflectance spectra increased with increasing water stress. As water stress indicator, foliar spectral analysis showed high reflectance which was primarily attributed to a 41 % reduction in chlorophyll concentration. The percentage reflectance at 550 ( $R_{550}$ ), structure independent pigment index (SIPI), and photochemical reflectance index (PRI) showed a strong relationship with foliar chlorophyll content (SPAD). These results suggested that well-watered plants at soil water field capacity (-0.03 MPa) showed greener and healthier leaf growth compared to that of the water-stressed plants.*

**Keywords:** *Jatropha curcas*, water stress, spectral reflectance, chlorophyll, soil water potential

### **INTRODUCTION**

The *Jatropha curcas* shrub is commonly known as “Jarak Pagar” in Malaysia, is a member of the Euphorbiaceae family. It grows wild and is generally cultivated for the oil from its seeds, which is being used to produce bio-diesel