

## **Assessment of colour indices derived from conventional digital camera for determining nitrogen status in rice plants**

### **Abstract**

Concerns over the use of nitrogen have increased due to the increase in fertilizer costs and environmental pollution from excess nitrogen applications in farms and paddy fields. This study assessed colour indices derived from images captured by two different kinds of conventional digital cameras (namely, Panasonic Lumix DMC-TZ10 and Basler Scout scA640-70fc) to determine the status of nitrogen in rice leaves. Thus, a randomized complete block design was conducted at Universiti Putra Malaysia's Experimental field in 2012. Digital images of the upper most collared leaf of rice (*Oriza sativa* L.), grown over a range of soil N treatments, were processed into twenty seven most common colour indices through six growth stages. The results indicated that both cameras could be used as sensors to determine the status of nitrogen in rice plants. In addition, there were strong relationships between most indices, especially colour indices which are associated with green and SPAD measurement values. However, the strongest relationship was found between green and Kawashima index, with  $R^2 = 0.561$  ( $p > 0.001$ ) and  $R^2 = 0.546$  ( $p > 0.001$ ), respectively. This indicates that conventional low-cost digital cameras can be used for determining Nitrogen content in rice leaf, and also offers a potentially inexpensive, fast, accurate and suitable tool for small farms.

**Keyword:** Colour indices; Conventional digital camera; Rice; Nitrogen; Remote sensing image