

## **Nutrient composition, total phenolic content, and antioxidant activity of tropical Kundasang-grown cucumber at two growth stages**

### **ABSTRACT**

The cucumber (*Cucumis sativus* L.) contains a significant amount of antioxidants, especially when harvested at the right time. The present study evaluated differences in nutrients, total phenolic content, and antioxidant activity of cucumbers grown in Kundasang, Malaysia, at the semi-ripe fruit (SR) and ripe fruit (R) maturation stages. Independent T-tests revealed significant differences ( $p < 0.05$ ) between proximate analysis data for the SR and R stages. Moisture content at the SR stage ( $98.217 \pm 0.068\%$ ) was higher than for R ( $97.617 \pm 0.221\%$ ); similar differences were observed for the carbohydrate content (SR:  $0.660 \pm 0.027\%$ , R:  $0.416 \pm 0.213\%$ ). The crude fiber (SR:  $0.320 \pm 0.012\%$ , R:  $0.576 \pm 0.083\%$ ), crude fat (SR:  $0.039 \pm 0.004\%$ , R:  $0.317 \pm 0.019\%$ ), ash (SR:  $0.422 \pm 0.366\%$ ), and crude protein (SR:  $0.418 \pm 0.018\%$ , R:  $0.651 \pm 0.069\%$ ) contents showed that the results for the R stage were greater than for SR. Individual elements in the SR and R fruit significantly differ ( $p < 0.05$ ), except for Se. However, Mo was undetected at both maturation stages. Results revealed that the R stage had a higher mineral content (mg 100 g<sup>-1</sup>) for Ca (SR:  $10.311 \pm 0.096$ , R:  $14.076 \pm 0.094$ ), Mg (SR:  $8.334 \pm 0.088$ , R:  $13.354 \pm 0.089$ ), Al (SR:  $0.468 \pm 0.009$ , R:  $1.746 \pm 0.019$ ), and Fe (SR:  $0.127 \pm 0.002$ , R:  $0.280 \pm 0.002$ ), whereas the SR stage had a lower Cu content (SR:  $0.037 \pm 0$ , R:  $0.058 \pm 0$ ). The phenolic content (mg g<sup>-1</sup> GAE) at the SR stage ( $352.683 \pm 33.240$ ) was higher than at the R stage ( $155.691 \pm 17.042$ ), and it was inversely correlated with their antioxidant activity, which was expressed in half maximal inhibitory concentration (IC<sub>50</sub>,  $\mu\text{g mL}^{-1}$ ) (SR:  $182.247 \pm 9.216$ , R:  $160.782 \pm 6.741$ ). Hence, the nutritional benefits of cucumbers grown in Kundasang are enhanced when harvested between the SR and R maturation stages.