

# Effects of Fruit Maturity on Physicochemical Properties, Sugar Accumulation and Antioxidant Capacity of Wild Harvested Kakadu plum (*Terminalia ferdandian*)

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**Abstract:** *Terminalia ferdinandiana* (Kakadu plum), belonging to the family Combretaceae, is endemic to Australia and has a long history of traditional medicinal applications and food cuisine by the Australian Indigenous people. This study investigated the effects of maturity stages on morphology, physicochemical parameters [total soluble solids (TSS), total acid content (TAC), pH], soluble sugar profile, and antioxidant capacity of Kakadu plum (KP) fruits that were wild harvested from different trees, and classified into four different maturity stages (immature to mature). TSS and TAC were determined by standard assays/procedures, main sugars by UHPLC–MS/MS, and antioxidant capacity [total phenolic content (TPC) and DPPH free radical scavenging capacity] by spectrophotometry. The results showed that soluble sugars (glucose, sucrose and fructose) from 1.3 to 17.7% dry weight (DW), TSS (17.0 - 52.7% DW) and TAC (1.3 - 6.7% DW) increased with maturity. However, TPC in the range of 7.4 - 21.9% DW and DPPH free radical scavenging capacity (22 - 76% inhibition at the extract concentration of 20 g.L<sup>-1</sup>) did not follow the same trend as the one observed for soluble sugars, TSS and TAC. These differences were associated with the tree-to-tree variability as a consequence of wild harvest condition. This study has provided important information to both the KP industry and Indigenous enterprises regarding the selection of the appropriate maturity stage to harvest KP fruit to target for different markets (e.g. low sugar vs. high sugar fruit).