

NUTRITIONAL PROPERTIES AND ANTIOXIDANT ACTIVITY OF *Moringa oleifera* PODS AT DIFFERENT MATURITY STAGES

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Moringa oleifera pods are highly nutritive; however, peels are discarded during consumption due to lignified outer layers at horticultural maturity. Nutrients in the peel remain untapped. This research aimed to quantify bioactive compounds and nutritional properties in *M. oleifera* pods at distinct stages of maturity. Five distinct maturity stages of *M. oleifera* were defined using visual quality and colour development. Nutritive quality of maturity stages was assessed by quantifying antioxidant activity and mineral contents using two extraction solvents. The DPPH radical scavenging activity assay, total polyphenolic content assay, ferric reducing antioxidant power assays, total nitrogen content, and mineral contents were significantly higher ($p < 0.05$) in early maturity stages. The highest DPPH radical scavenging activities were observed in maturity stage two for dichloromethane extract (19.66 ± 3.70 mg TE mL⁻¹ of sample) and maturity stage 1 (31.74 ± 3.61 mg TE mL⁻¹ of sample) for ethanolic extract. The highest recorded total polyphenolic content was observed at maturity stage 4 (0.02 ± 0.0011 µg GAE/total g of fresh pod) under dichloromethane extract compared to maturity stage 1 (5.74 ± 0.027 µg GAE/total g of fresh pod) under ethanolic extract. The ferric-reducing antioxidant power assays were at highest at maturity stage 1 for both extracts, while the total flavonoid content remained at zero for all maturity stages irrespective of extract. Total nitrogen content of maturity stage 2 (4452.00 ± 74.14 mg 100 g⁻¹) was the highest, while Mg, Cu, Zn, Na, K, and Ca were recorded as the highest at maturity stage 1 (18.64 ± 0.06 ppm, 53.91 ± 0.20 ppb, 248.12 ± 0.49 ppb, 5.35 ± 0.01 ppm, 271.43 ± 0.68 ppm, 34.12 ± 0.09 ppm). In contrast, the highest Fe content was recorded at maturity stage 5 (0.62 ± 0.002 ppm). The present study concluded that maturity stage 1 *M. oleifera* may deliver better functionality and nutritive benefits compared to late maturity stages, which could be delivered through value addition.

Keywords: Dichloromethane extract, DPPH radical scavenging activity, Ethanolic extract, Total polyphenolic content