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ANTIOXIDANT ENCAPSULATION AND BIOACCESSIBILITY IMPROVEMENT OF SELECTED UNDERUTILIZED WILD EDIBLES

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Underutilized wild edibles (UWE) such as *Commelina diffusa* (Girapala) and *Acrostichum aureum* (Kerenkoku) have extensively been reported for their nutritional and antioxidant activity. Nanoencapsulation is used to overcome antioxidant depletion due to chemical and mechanical barriers in the digestive process. This study aims to produce an encapsulated edible fibre mat. This includes ethanol extracts of tender leaves of *C. diffusa* and *A. aureum* (0.2%) as a natural source of antioxidants with a high bioaccessibility fraction. Antioxidant extracts from selected UWE were encapsulated in wall material, hydroxypropyl-β-cyclodextrin (70%) and poly (ethylene oxide) (30%) using the electrospinning technique. The nutritional and physical properties of encapsulated fibre mats were investigated. Physical properties were revealed by scanning electron microscopy, transmission electron microscopy and differential scanning calorimetry. Fibre mats were then assessed for total polyphenol content, ascorbic acid content and antioxidant capacity. Obtained fibre mats by *A. aureum* showed the highest antioxidant activity (DPPH: IC50 value of 0.192 mg/mL, ABTS:352.45 Trolox equivalent antioxidant capacity), total phenolic content [334 gallic acid equivalents (GAE) mg/100 g] and ascorbic acid content (1.52 mg/100 g) compared to the fiber mat by *C. diffusa*. The effect of *in vitro* digestion on the antioxidant-encapsulated fibre mats of selected UWE was evaluated, and the bioaccessibility fraction was calculated. Both antioxidants-encapsulated fibre mats showed an increment in their bioaccessibility fraction while it was 67.3% in *A. aureum* loaded fibre mat and 57.7% in *C. diffusa*-loaded fibre mat. In this study, electrospinning was identified as an effective method to improve antioxidant bioaccessibility fraction in ethanol extracts of tender leaves of *C. diffusa* and *A. aureum*.

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