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In vitro antihypertensive and antioxidative properties of trypsin-derived Moringa oleifera seed globulin hydrolysate and its membrane fractions

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Moringa oleifera seed hydrolysate was obtained by trypsin hydrolysis of the seed globulin protein followed by membrane ultrafiltration process in an amicon stirred ultrafiltration cell to produce peptides with different molecular weight sizes (<1, 1-3, 3-5 and 5-10 kDa). The samples were evaluated for antioxidant properties through free radical scavenging abilities (DPPH and hydroxyl radical scavenging assays), inhibition of metal iron (FRAP and metal chelation tests) and in vitro antihypertensive properties through angiotensin converting enzyme (ACE) and renin inhibition tests. The results showed the degree of hydrolysis as 7.89%). Compared to the hydrolysates, membrane fractionation led to improved antioxidative properties of 29.13% (<1 kDa), 180% (<1 kDa) and 30.58% (1-3 kDa) increase for DPPH, FRAP and metal iron chelation, respectively. There was however 48.77% reduction (1-3 kDa) in hydroxyl radical scavenging activity after membrane fractionation. Evaluation of the potential antihypertensive abilities of the membrane fraction peptides indicated that membrane fractionation led to improvement in ACE inhibitory potentials of the peptides with the 1-3 kDa peptide showing significantly highest ($p<0.05$) ACE inhibition (72.48%). In contrast however, the membrane fraction peptides showed very low (17.64%, 1-3 kDa) inhibition against the renin enzyme. Generally, the lower peptides (<1 and 1-3 kDa) showed greater potentials as antihypertensive and antioxidant peptides. It was concluded that hydrolysis of M. oleifera seed globulin with trypsin produced peptides and peptide fractions with potential antioxidant and antihypertensive properties. These properties could be exploited by using the hydrolysate and peptide fractions as ingredients in the formulation of functional foods and nutraceuticals.

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