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A 6.7 kDa Cationic antimicrobial peptide from *Moringa oleifera* seeds: Purification and characterisation

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Antimicrobial cationic peptides are innate host-defence molecules found across diverse species. The broad-spectrum bioactivities of these small basic peptides could be effectively employed against the growing number of drug-resistant microbes. The high stability of plant-derived antimicrobial peptides brings in a promising template for designing novel antibiotics. *Moringa oleifera*, a member of the Moringaceae family, is widely cultivated around the world due to its exceptional nutritional profile. Various plant parts have demonstrated diverse biological activities, underscoring the species' longstanding importance in traditional medicinal practices. While numerous bioactive constituents from *M. oleifera* have been identified, the identities of several compounds that may contribute to its therapeutic potential are still elusive. The present investigation was targeted to isolate and characterise cationic antimicrobial peptide(s) from *M. oleifera* seeds. The peptide components extracted under acidic conditions were fractionated by ammonium sulfate precipitation and subsequently purified by size exclusion chromatography. One purified basic peptide of approximately 6.7 kDa exhibited broad range antimicrobial activity against *S. typhimurium*, *S. aureus* and *C. albicans*, with minimum inhibitory concentration (MIC) values of 16, 32, and 32 $\mu\text{g/mL}$, respectively. The activity was stable up to 70°C and at pH values of 5–8. Treatment with pronase, proteinase K, and trypsin fully inactivated the purified peptide, abolishing its activity against all three tested pathogens. Divalent (Ca^{2+} , Mg^{2+}) and trivalent (Fe^{3+}) cations had a weak inhibitory effect on the activity. This study hence brings to the fore characteristics of an unreported, highly stable, low molecular weight cationic peptide that significantly contributes to the antimicrobial properties of *M. oleifera* seeds.

Keywords: AMPs, Antimicrobials, Cationic peptides, *Moringa oleifera*, Seed peptide, Thermostable peptides

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