Appraising *Moringa oleifera* Lam. via Phytochemicals and *in vitro* Biological Assays

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Abstract:

Background: About three fourth of the world population still depend on natural product remedies specially obtained from the plants. There is high proportion of plant diversity on the earth which need screening for the evaluation of important secondary metabolites.Approximately 10,000 to 53,000 herbs/plant species are used traditionally worldwide. *Moringa oleifera* tree has been referred as the 'miracle tree' for not only its nutritional value but also pharmacological prospects. The present study utilizes leaf, stem,bark and root of *moringa* for extraction optimization and to determine most proficient solvent extract for chosen pharmacological attributes.

Methods: Different plant parts (leaf, stem,bark and root)were subjected to successive extraction by using solvents of escalating polarities i.e. n-hexane, ethyl acetate, methanol and distilled water. *In vitro* phytochemicals and biological potential determination was carried out on different extracts obtained during successive solvent extraction. Total phenolics and flavonoids content were determined calorimetrically. Multimode antioxidant (total antioxidant capacity, total reducing power and free radical scavenging) assays were performed by calorimetric method. Antibacterial, antifungal and protein kinase inhibition spectrums of different plant parts extracts were determined by disc diffusion assays. Glucose modulation ability was assessed by-amylase inhibition assay. Brine shrimp lethality assay was used to determine the cytotoxic potential of the extracts.

Results: Among the various solvent extracts, maximum percent extract recovery was obtained from aqueous leaf extract. Total phenolics contents were mostly depicted in stem methanolic extracts ,while maximum total flavonoids contents were quantified by aqueous leaf extract. Total antioxidants capacity and reducing power potential were identified upto significant amounts in aqueous leaf extracts and stem methanolic extracts respectivley.Aqueous leaf extract showed highest DPPH free radical scavenging activity. Significant antibacterial activity was exhibited by aqueous leaf extract against *Pseudomonas aeruginosa*, *E. coli* and *Klebsiella pneumonia.* Maximum zone of inhibition against *Mucor* was shown by stem methanolic extract. Medium polarity ethyl acetate stem extract depicted most potent protein kinase inhibition activity against *streptomyces* 85E strain. A noteworthy α-amylase inhibition was revealed by leaf n-hexane extract. Cytotoxic activity against brine shrimp categorized non polar n-hexane leaf extract as the most potent when compared to stem, bark and root extracts.

Conclusions: In the current study, it was concluded,that extraction efficiency and biological activities strongly rely upon the nature of extraction solvent polarity,due to diverse compounds of varied chemical characteristics.By using bioassay guided isolation technique, novel chemical entities can be isolated from *Moringa oleifera*.