

Investigation of neuroprotective activity of some Sri Lankan spices

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Alzheimer's disease, a major cause of dementia is one of the most prevalent neurodegenerative diseases among elderly population. One of the approaches to treat Alzheimer's disease (AD) is to prolong the existence of acetylcholine at the synaptic cleft through the inhibition of acetylcholinesterase (AChE) enzyme. This strategy has been used to improve the cognitive decline in people with age related neurodegenerative disorders. There is an urgent need to search for compounds with fewer side effects to treat neurodegenerative diseases. Natural products can play a prominent role regarding this. Present study is aimed at investigating AChE inhibitory activity of spices used in Sri Lankan cuisine. Spices are vital components of Asian diet and also serve as rich source secondary metabolites with interesting biological activities. Ten common spices used in Sri Lankan cuisine namely clove, coriander, fennel, fenugreek, ginger, lemongrass, mustard, mace, pepper and tamarind were screened for AChE inhibitory assay. These spices were purchased from local market and sequentially extracted into hexane, dichloromethane (DCM), ethyl acetate (EtOAc) and methanol (MeOH) using ultrasonication. The anticholinesterase activities of the above extracts were tested *in vitro*, following Ellman's method with slight modifications. Out of the tested extracts, the highest AChE inhibitory activity was observed in crude extracts of mace (*Myristica fragrans*, IC₅₀; hexane- 29.0±0.1, DCM- 21.4±0.1, EtOAc- 18.3±0.1 and MeOH- 13.4±0.1 mg/mL). EtOAc and methanol extracts of *M. fragrance* were combined and subjected to activity guided fractionation to afford 6 compounds (SSMF 1 - SSMF 6). Compound SSMF 1 showed the highest AChE inhibitory activity having IC₅₀ of 2.1±0.1 ppm (positive control donepezil - 0.02 ppm). Four compounds were found to be moderately active; SSMF 2- 10%, SSMF 3- 27%, SSMF 4-, 48%, SSMF 5- 20% at 100 ppm level. SSMF 6 did not show any AChE inhibition. Structure elucidation of isolates are in progress.

Keywords: *Alzheimer's disease, spices, acetylcholinesterase*