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Acetylcholine Esterase Inhibitors from Sri Lankan Medicinal Plant Extracts

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Abstract

Medicinal plants are being recognized as promising sources of drug leads in the development of novel pharmaceutical agents for the management of Alzheimer's disease (AD). Approaches to enhance cholinergic function in AD have included prolonging the availability of acetylcholine (ACh) released into the neuronal synaptic cleft by inhibiting ACh hydrolysis via AChE inhibitors. In addition, strong experimental evidences have shown that the oxidative damage plays a major role in neurological degeneration in the pathogenesis of AD. The objective of the study was to determine the acetylcholinesterase (AChE) inhibitory activity and antioxidant activity in selected Sri Lankan medicinal plants. AChE inhibitory activity of the selected medicinal plant extracts was determined using the Ellman's method. The antioxidant activities were determined by four *in vitro* methods namely DPPH assay, FRAP assay and NO assay. The contents of total polyphenol and flavonoid were determined quantitatively. Out of the ten selected medicinal plant extracts the leaf extracts of *Abrus precatorius* (Olinda), *Centella asiatica* (Gotukola), *Ricinus communis* (Erandu) and fruit extract of *Strychnos nux-vomica* (Goda Kaduru) showed IC_{50} values < 200 µg/mL for AChE inhibitory activity. A high antioxidant activity was shown in the aerial extract of *C. Halicacabum* and in leaf extracts of *C. asiatica* and *R. communis* in three selected antioxidant assays. The total polyphenol content and total flavonoid content were in the range of 0.55-7.30 mg/g dry weight and 19.08±0.29-1283.08± 0.09 µg/g dry weight respectively. The extracts of *A. precatorius*, *C. asiatica*, *S. nux-vomica* and *R. communis* are deserved to be as potent sources of AChE inhibitors as well as natural antioxidants. Considering the complex multifactorial etiology of AD, these plant extracts would be apt candidates for the development of novel pharmaceutical agents in the management of AD.

Key words: *AChE inhibitors, Alzheimer's disease, Antioxidant activity, Sri Lankan medicinal plants*

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