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### **In vitro inhibition of acetylcholinesterase and antioxidant activity of selected medicinal plant extracts**

S P Samaradivakara and J K R R Samarasekera\*

Industrial Technology Institute, 363, Baudhaloka Mawatha, Colombo 07

Alzheimer's disease (AD) is one of the most common types of dementia. Inhibition of Acetylcholinesterase enzyme to prolong the cholinergic neurotransmission is one means of treating the disease. The objective of the study was to evaluate and determine acetylcholinesterase inhibitory (AChEi), antioxidant activities and polyphenol content of the ethanolic extracts of *Annona muricata* L. (Katu Atha) bark (AMB), *Flueggea leucopyrus* Wild. (Katupila) leaves (FLL), *Hemidesmus indicus* L.R.Br. (Iramusu) leaves (HIL), *Elephantopus scaber* L. (Athadi) whole plant (ESW) and *Plectranthus hadiensis* Forssk. (Iriveriya) leaves (PHL). Air-dried and powdered plant materials were separately extracted thrice with ethanol by cold extraction technique. AChEi activity was measured according to the modified Ellman method. Antioxidant activities were evaluated using, 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging, ferric reducing antioxidant potential (FRAP) and oxygen radical absorbance capacity (ORAC) assays and Total phenolic content (TPC) by Folin–Ciocalteu method. All assays were carried out in triplicates using Spectra Max 96 well microplate reader (Table 1). Galanthamine ( $IC_{50}$   $0.46 \pm 0.02$   $\mu\text{g/mL}$ ), Trolox ( $IC_{50}$   $4.6 \pm 0.0$   $\mu\text{g/mL}$ ) and green tea ( $1362.82 \pm 0.22$  mg TE/g of extract) were used as standards for AChEi, DPPH and ORAC assays, respectively. The results indicate that AMB and FLL extracts have good AChEi and antioxidant activities warranting further studies could discover novel ingredients for managing AD.

Table 1: AChEi, Antioxidant activity and total TPC of plant extracts

Plant	AChEi activity		Antioxidant activity		Total phenols
	$IC_{50}$ ( $\mu\text{g/mL}$ )		(mg TE/g of extract)		(mg GAE/g of extract)
		DPPH	FRAP	ORAC	
AMB	$88.45 \pm 4.81$	$10.85 \pm 0.45$	$3058.6 \pm 1.27$	$1980.58 \pm 0.23$	$330.61 \pm 1.30$
FLL	$109.51 \pm 8.30$	$15.37 \pm 0.07$	$2170.6 \pm 0.63$	$805.96 \pm 0.03$	$204.52 \pm 0.31$
HIL	$151.80 \pm 2.16$	$105.4 \pm 2.55$	$334.00 \pm 0.35$	$178.33 \pm 0.11$	$24.23 \pm 0.10$
ESW	$197.14 \pm 2.91$	$129.05 \pm 2.61$	$696.00 \pm 4.38$	$208.44 \pm 0.36$	$51.71 \pm 0.16$
PHL	$241.42 \pm 2.17$	$330.27 \pm 4.24$	$94.53 \pm 4.73$	$123.82 \pm 0.24$	$9.51 \pm 0.19$

Data represented as  $\pm$  mean SE (n= 3).

Keywords: Acetylcholinesterase, antioxidant, medicinal plants

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