

Determination of anti-acetylcholinesterase of *Cymbopogon nardus* ethanolic extract

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Structured Abstract

Background: Alzheimer's disease (AD) is a disorder that causes cell degeneration in the brain and is the leading cause of dementia. A promising approach for treating neurological disorders like Alzheimer's disease is to inhibit acetylcholinesterase (AChE). Therefore, it is important to investigate anti-AChE that can be obtained from plant-based products that may have fewer or no side effects. This study aims to determine the percentage of yield under different drying methods, examine the anti-AChE activity and bioactive substances of *Cymbopogon nardus* ethanolic extract.

Methods: *Cymbopogon nardus* was dried using three different methods which are sun-drying, air-drying and oven-drying. Then the plant material extracted in ethanol and the extracts obtained were used for further determination of anti-AChE activity by using Ellman (1961). Then, the analysis of the bioactive compounds was done by using GCMS analysis.

Results: Oven drying exhibited the highest average percentage of yield, with a mean of 9.40% (± 0.09), whereas sun drying and air drying achieved lower yields with means of 8.90% (± 0.09) and 8.93% (± 0.09) respectively. The plant material suggests low potency of inhibition with IC₅₀ value 1.21 (± 0.787) mg/mL. The GC-MS analysis revealed the presence of various chemical compounds in the essential oil of *Cymbopogon nardus*. The major compound identified was geraniol (59.43%), which exhibited a promising peak in the chromatogram. Other significant compounds included citronellal (5.34%), citronellol (4.48%), and citral (4.75%). Additionally, minor compounds such as linalool (1.04%), oxiranecarboxaldehyde (1.53%), eugenol (1.74%), geranyl acetate (2.32%), caryophyllene (3.75%), naphthalene (2.56%), caryophyllene oxide (1.47%), neophytadiene (3.82%), hexadecanoic acid (2.36%), and 9,12,15-octadecatrienoic acid (2.32%) were also detected.

Conclusion: This study exhibited that *Cymbopogon nardus* possesses a low potency of inhibition on anti-AChE activity. Geraniol is the main bioactive in this plant that may be related to anti-AChE activity. The potential of *Cymbopogon nardus* as AD alternative treatment should be further investigated as the existing data may be limited by the methodologies employed.

Keywords: Anti-acetylcholinesterase activity, *Cymbopogon nardus*, ethanolic extract, geraniol

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