

Determination of anti-acetylcholinesterase and antimicrobial activity of *Curcuma longa* and *Curcuma zedoaria* rhizome ethanolic extract

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Structured Abstract

Background: *Curcuma longa* and *Curcuma zedoaria* is widely cultivated across the Asian continents due to its use in traditional medicine and cuisine. Both plants were used in a large number of research and attract scientists around the world due to various potential therapeutic properties such as anti-inflammatory and anti-oxidant properties. Hence this study aimed to determine the percentage yield, effectiveness towards anti-acetylcholinesterase and antimicrobial activity and bioactive substances of *Curcuma longa* and *Curcuma zedoaria* rhizome ethanolic extract.

Methods: Plant materials were extracted in ethanol and the extracts obtained were used for further determination of anti-acetylcholinesterase by Ellman's and antimicrobial activity using disk diffusion method. Then, the analysis of the bioactive compounds was done by using GCMS analysis.

Results: In this study, ethanolic extraction of both plants depicted that *Curcuma longa* has 10.88% percentage yield and *Curcuma zedoaria* 8.92% percentage yield. Through Ellman's assay, both extracted plant materials showed lower potency of inhibition with IC₅₀ value 1.645±0.091 mg/mL and 1.608±0.549 mg/mL respectively. In antimicrobial test, both extracted plant materials showed strain specific activity where *Curcuma longa* inhibited *E. coli* growth while *Curcuma zedoaria* inhibited *S. aureus* and *B. subtilis* growth. There were 6 major chemical compounds found in *Curcuma longa* that makes up 77.89% of total mass spectra namely turmerone (34.81%), ar-turmerone (21.56%), curlone (19.45%), benzene,1-(1,5-dimethyl-4-hexenyl)-4-methyl (1.15%), caryophyllene (0.50%) and eucalyptol (0.42%). *Curcuma zedoaria* on the other hand showed 9 bioactive substances that makes up 11.77% of total mass spectra namely curcumenone (3.96%) with the highest area from the nine compounds spectra followed by zederone (2.45%), germacrene d (1.40%), isospathulenol (1.08%), (+)-2-bornanone (0.99%), curcumenol (0.97%), neointermedeol (0.39%), eucalyptol (0.325) and caryophyllene (0.21%).

Conclusion: This study exhibited that *Curcuma longa* and *Curcuma zedoaria* possesses a low potency of inhibition on anti-acetylcholinesterase activity, suggesting further study are needed to evaluate its potential as alternative treatment for AD. Both extracted plant materials depicted strain specific activity towards *E. coli*, *B. subtilis* and *S. aureus*. Hence, the plant materials could be suggested as an alternative for microbial infections treatment.

Keywords: Anti-Acetylcholinesterase, Antimicrobial activity, *Curcuma longa*, *Curcuma zedoaria*, ethanolic extract.

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