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## **In-vitro inhibition of human erythrocyte acetylcholinesterase by salvia lavandulaefolia essential oil and constituent terpenes.**

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### **Erratum in**

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### **Abstract**

Sage (*Salvia* spp) is reputed in European herbal encyclopaedias to enhance memory, and current memory-enhancing/anti-dementia drugs are based on enhancing cholinergic activity by inhibiting cholinesterase. In this study the effects of *Salvia lavandulaefolia* Vahl. (Spanish sage) essential oil and some of its constituent terpenes on human erythrocyte acetylcholinesterase were examined in-vitro. The main constituents in the essential oil batch used for analysis of cholinesterase inhibition were camphor (27%), 1,8-cineole (13%), alpha- and beta-pinene (10-15%) and bornyl acetate (10%) with other minor constituents (1% or less) including geraniol, limonene, linalool, terpineol and gamma-terpinene. Using the Ellman spectrophotometric method, kinetic analysis was conducted on the interaction of the essential oil and the main monoterpenoids, camphor, 1,8-cineole and alpha-pinene. IC<sub>50</sub> values were obtained for the essential oil, 1,8-cineole and alpha-pinene and were 0.03 microL [corrected] mL(-1), 0.67 mM and 0.63 mM, respectively. Camphor and other compounds tested (geraniol, linalool and gamma-terpinene) were less potent (camphor IC<sub>50</sub>: >10mM). The essential oil, alpha-pinene, 1,8-cineole and camphor were found to be uncompetitive reversible inhibitors. These findings suggest that if the inhibitory activity of the essential oil is primarily due to the main inhibitory terpenoid constituents identified, there is a major synergistic effect among the constituents. Since no single constituent tested was particularly potent, it remains to be determined whether these in-vitro cholinesterase inhibitory activities are relevant to in-vivo effects of the ingestion of *S. lavandulaefolia* essential oil on brain acetylcholinesterase activity.

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**Publication type, MeSH terms, Substances**



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