

Aromatic Plants as a Potential Source of Acetylcholinesterase and Butyrylcholinesterase Inhibitors †

Silvana Rodriguez ^{1,*}, Damian Belladonna ², Roberto Rodriguez ², Ana Paula Murray ¹

¹ INQUISUR – CONICET, Departamento de Química, UNS, Bahía Blanca, Pcia. Bs.As., Argentina; sarodrig@uns.edu.ar (S.R.); apmurray@uns.edu.ar (A.M.)

² Departamento de Agronomía, UNS, Bahía Blanca, Pcia. Bs.As., Argentina; damianbelladonna@gmail.com (D.B.); rrodrig@uns.edu.ar (R.R.)

* Correspondence: sarodrig@uns.edu.ar (S.R.);

† Presented at The Sixth International Meeting of Pharmaceutical Sciences (RICiFa), November 10-12, 2021, Córdoba, Argentina

Received: 26.04.2022; Revised: 4.05.2022; Accepted: 6.05.2022; Published: 8.05.2022

Abstract: The inhibition of the enzymes acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) is relevant for discovering new alternatives in the treatment of Alzheimer's disease. The inhibition of the activity of both AChE and BChE by the essential oils of four aromatic species cultivated in the Southwest of Buenos Aires province *Artemisia absinthium* (1), *Lavandula hybrida* (2), *Melissa officinalis* (3) and *Rosmarinus officinalis* (4) was studied. The chemical composition of the essential oils obtained from aerial parts by hydrodistillation was determined by gas chromatography-mass spectrometry (GC-MS). Enzymatic inhibition was determined spectrophotometrically by Ellman's method. Essential oil 3, containing menthol and geraniol as major components, showed the most effective AChE inhibition ($IC_{50} = 50.35$ ng/mL). In addition, 1, 2, and 4, containing caryophyllene, showed potent AChE inhibition ($IC_{50} = 126.9 - 205.9$ ng/mL). On the other hand, 2 presented potent BChE inhibitory activity with $IC_{50} = 35.63$ ng/mL, which could be explained by the presence of 1,8-cineole and α -pinene. Also, 1, 3, and 4, containing myrcene, showed good BChE inhibition ($IC_{50} = 84.04 - 442.1$ ng/mL). These results suggest that these plants and/or their components could lead to developing new anti-Alzheimer agents.

Keywords: *Artemisia absinthium*; *Lavandula hybrida*; *Melissa officinalis*; *Rosmarinus officinalis*; acetylcholinesterase; butyrylcholinesterase; enzyme inhibition.

© 2022 by the authors. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Funding

This research was funded by Universidad Nacional del Sur PGI-UNS 24/ Q105 and ANPCyT

Acknowledgments

This research has no acknowledgment.

Conflicts of Interest

The authors declare no conflict of interest.