Abstract

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The aim of this study was to isolate alkaloids from joined fraction no. 55-67 (A2) obtained from the total alkaloid fraction of extract of *Fumaria officinalis* L. (Fumariaceae) plant. Using chromatography methods three alkaloids were isolated and then identified by structural analysis (GC-MS, NMR). Three alkaloids were isolated by using common chromagografic methods and then identified by structural analyses optical rotation and melting point as (–)-*O*-methylfumarophycine, (–)-sinactine a (–)-stylopine.

Inhibitory activity of isolated alkaloids was assessed against human erythrocyte acetylcholinesterase, human butyrylcholineesterase and prolyl oligopeptidase. The results were expressed as IC_{50} values ((–)-stylopine: $IC_{50\ AChE}$ and $IC_{50\ BuChE}$ > 1000 μM, $IC_{50\ POP}$ > 1000 mM; (–)-*O*-methylfumarophycine: $IC_{50\ AChE}$ = 963.10 ± 135.98 μM, $IC_{50\ BuChE}$ = 1771.0 ± 380.94 μM, $IC_{50\ POP}$ – unmeasured; (–)-sinactine $IC_{50\ AChE}$ = 632.0 ± 68.12 μM, $IC_{50\ BuChE}$ = 8154.3 ± 981.42 μM, $IC_{50\ POP}$ = $IC_{50\ POP}$ = 52.9 ± 1.8 μM)**.** None of alkaloids isolated showed better inhibitory activity againts cholinesterases than galantamine ($IC_{50\ AChE}$ = 1.71 ± 0,07 μM, $IC_{50\ BuChE\ =}$ 42.03 ± 1.30 μM), huperzine A ($IC_{50\ AChE}$ = 0.033 ± 0.001 μM, $IC_{50\ BuChE}$ > 1000 μM) and physostigmine ($IC_{50\ AChE}$ = 0.063 ± 0.001 μM, $IC_{50\ BuChE}$ = 0.130 ± 0.004 μM). And it's obvious they are not responsible for inhibitory activity of the total alkaloid fiction ($IC_{50\ AChE}$ = 39.2 ± 1.96 μg/ml, $IC_{50\ BuChE}$ = 40.32 ± 1.9 μg/ml). At POP (–)-sinactine ($IC_{50\ POP}$ = 52.9 ± 1.8 μM) appears to be very active, with inhibitory activity exceeding inhibitory activity of the standard baicalin ($IC_{50\ POP}$ = 0,610 ± 0,021 mM), but not as strong as Z-pro-prolinal ($IC_{50\ POP}$ = 3.27 ± 0,02 nM).

Key words: acetylcholinesterase, Alzheimer's disease, butyrylcholinesterase, *Fumaria officinalis* L., prolyl oligopeptidase.