Abstract


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 chromatographic 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 μM; (−)-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 faction (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.