Abstract

Bulvová, L.: Alkaloids of *Papaver rhoeas* L. (Papaveraceae) and their biological activity related to Alzheimer's disease I. Diploma thesis, Charles University, Faculty of Pharmacy in Hradec Králové, Department of Pharmaceutical Botany and Ecology, Hradec Králové 2017.

The aim of this study was to process the summary alkaloidal extract of aerial parts of *Papaver rhoeas* L.; to isolate contained alkaloids using chromatographical methods; to identify them and to determine their inhibitory activity towards human enzymes acetylcholinesterase, butyrylcholinesterase and prolyloligopeptidase. Two alkaloids (+)-rhoeagenine and LB-2 were isolated, and the structure of LB-2 (its absolute configuration) is being determined nowadays.

In vitro biological assays of these alkaloids found the following results: (+)-rhoeagenine (IC_{50} AChE > 1000 μM, IC_{50} BuChE = 230 ± 10 μM, IC_{50} POP = 878 ± 45 μM) and LB-2 (IC_{50} AChE > 1000 μM, IC_{50} BuChE = 314 ± 13 μM, IC_{50} POP = 706 ± 2 μM).

The determined IC_{50} values of isolated alkaloids were compared with inhibitory standards of cholinesterases galanthamine (IC_{50} AChE = 1,71 ± 0,065 μM, IC_{50} BuChE = 42,30 ± 1,30 μM), huperzine A (IC_{50} AChE = 0,033 ± 0,001 μM, IC_{50} BuChE > 1000 μM, IC_{50} POP > 1000 μM) and rivastigmine (IC_{50} AChE = 0,037 ± 0,001 μM, IC_{50} BuChE = 0,0033 ± 0,0003 μM); with POP standards berberine (IC_{50} POP = 142 ± 21 μM) and *Z*-pro-prolinal (IC_{50} POP = 3,27 ± 0,02 nM). None of the isolated compounds showed better inhibitory activity than the used reference compounds.

Key words: *Papaver rhoeas*, Papaveraceae, Alzheimer's disease, acetylcholinesterase, butyrylcholinesterase, prolyl oligopeptidase