

ABSTRACT

Bednaříková L.: Biologically active metabolites of plants 4. Alkaloids from *Eschscholtzia californica* CHAM. and their biological activity. Charles University in Prague, Faculty of Pharmacy in Hradec Králové, Department of Pharmaceutical Botany and Ecology, Hradec Králové, 2011. Diploma thesis. 65 p.

The aim of the diploma thesis was to process the pool of quaternary alkaloids from *Eschscholtzia californica* CHAM. (Papaveraceae). By means of column chromatography two alkaloids were isolated and subsequently subjected to structural analysis (MS and NMR studies). The first substance was identified as a tertiary alkaloid allocryptopine, the second one was a quaternary base californidine. Both alkaloids have previously been isolated from *E. californica*.

Both substances were tested for their inhibitory activity against human erythrocyte acetylcholinesterase (HuAChE) and human plasma butyrylcholinesterase (HuBuChE). The measured values for allocryptopine were IC_{50} (HuAChE) = $250 \pm 22,2 \mu\text{M}$ and IC_{50} (HuBuChE) = $530 \pm 28,2 \mu\text{M}$. Californidine's values were IC_{50} (HuAChE) = $36,7 \pm 0,9 \mu\text{M}$ and IC_{50} (HuBuChE) > $1000 \mu\text{M}$. Galanthamine (IC_{50} (HuAChE) = $6,9 \pm 0,3 \mu\text{M}$, IC_{50} (HuBuChE) = $156 \pm 6,9 \mu\text{M}$) and huperzine A (IC_{50} (HuAChE) = $0,25 \pm 0,01 \mu\text{M}$, IC_{50} (HuBuChE) > $1000 \mu\text{M}$) were used as positive controls. In comparison to standard allocryptopine was little active. Although the inhibitory activity of californidine against HuAChE was promising, its quaternary structure restricts the transport through the blood-brain barrier. Nor allocryptopine neither californidine can be considered as a potential substance in Alzheimer's disease treatment.

Both alkaloids were also subjected to studies of their antioxidant activity. In both cases the resulting EC_{50} values were higher than $1000 \mu\text{M}$. These substances do not show any therapeutically significant antioxidant activity.

Keywords: *Eschscholtzia californica* CHAM., isoquinoline alkaloids, acetylcholinesterase, butyrylcholinesterase, Alzheimer's disease.