Abstract

Eliška Emrichová: Isolation of alkaloids of the species Geissospermum vellosii Allemão and study of their biological activity IV. Diploma thesis 2020. Charles University, faculty of Pharmacy in Hradec Králové, Department of Pharmacognosy.

Key words: *Geissospermum vellosii*, bark, alkaloidal extracts, isolation of alkaloids, GC/MS analysis, biological aktivity, acetylcholinesterase, butyrylcholinesterase.

The aim of this study was to isolate at least one pure alkaloid from the extract of *Geissospermum vellosii* Alemão bark. The whole process involved bark processing, to obtain summary and alkaloid extract and subsequent column chromatography. GV-4, one of the 16 obtained fractions, was separated into 5 subfractions. The GV-4b subfraction was used to isolate pure alkaloids, processed by preparative thin layer chromatography and crystallization of pure compound. The structure of pure compound was determined by using NMR, GC-MS analysis and optical rotation. This compound was identified as anhydropereirine and was tested its inhibitory activity against human cholinesterases, AChE and BuChE.

The alkaloids GV-1-a, GV-8-3-B, GV-9-c were isolated in the course of further work on the extract. Their inhibitory activity against GSK-3β was tested as well as their possibility to cross the blood-brain-barieer with PAMPA BBB assay. Those compounds were identified as quebrachamine, mixture of diasteromeres- vellosimine and geissoschizolline. GSK-3β inhibitory activity was determined by using the in vitro luminescence method of Baki et al. (2007). The best % of inhibition showed GV-8-3-B and was tested its IC_{50} with result $IC_{50} = 7.18 \pm 1.12$ μM. Testing the possibility of our compounds to cross BBB was provided by using reference and tested compounds. The results were determined by recording of UV spectra by UV spectrophotometer. The best permeability was shown in GV-1-a, which can cross the BBB slightly.

Inhibitory activity of anhydropereirine against AChE, BuChE was very low. Other tested alkaloids showed interesting inhibitory activity against GSK-3β and showed, that GV-1-a, GV-9-c can cross the BBB slightly and GV-8-3-B can cross the BBB less than previous compounds.