Abstract

Lucie Váňová: Isolation of alkaloids of the species *Geissospermum vellosii* Allemão and study of their biological activity IV. Diploma thesis, Charles University, Faculty of Pharmacy in Hradec Králové, Department of Pharmacognosy and Pharmaceutical Botany, Hradec Králové 2022.

Key words: bark, *Geissospermum vellosii* Allemão, alkaloids, preparative TLC, GC-MS, NMR, (+)-19,20-dehydrotubifolidine, aspidolimidine, geissoreticulatine, inhibition activity, AChE, BuChE, Alzheimer‘s disease

The aim of this diploma thesis was the isolation of at least 3 alkaloids in pure form from the GV-5 fraction, which was extracted from the bark of the South American tree *Geissospermum vellosii* Allemão. By using preparative thin layer chromatography (TLC), 9 subfracions (GV-5-A až GV-5-I) were acquired from this fraction. Those that were of sufficient mass were subsequently subjected to further division. Three alkaloids in pure form were isolated through purification using preparative TLC: GV-5-B-3-A, GV-5-C-4-C, GV-5-C-2-B-1.

Gained active substances from this plant were analyzed by gas chromatography-mass spektrometry (GC-MS) and nuclear magnetic resonance (NMR). By comparing the obtained alcaloid‘s spectra with available data and literature, those alkaloids were identified as: (+)-19,20-dehydrotubifolidine (GV-5-B-3-A), aspidolimidine (GV-5-C-4-C) and geissoreticulatine (GV-5-C-2-B-1).

The identified indol alkaloids (+)-19,20-dehydrotubifolidine and aspidolimidine were subsequently *in-vitro* tested for their inhibition activity against acetylcholinesterase (AChE) and bytyrylcholinesterase (BuChE) using Elleman’s spectrofotometric method. Due to low activity of isolated alkaloids, comparing to standards galanthamine, huperzine A and berberine, there was no IC_{50} for inhibition of the AChE determined for any of them and only for (+)-19,20-dehydrotubifolidine the IC_{50} against BuChE was determined (IC_{50} = 64,06 ± 7,00 μM). The obtained results from this study show that the isolated alkaloids do not have a significant potential for use in the treatment of the Alzheimer‘s disease on the principle of cholinesterase inhibitiors drugs, which are nowadays used to cure this illness.