Abstract

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Title of thesis: Alkaloids of *Narcissus* species cultivars and their biological activity III.

Key words: *Narcissus*, alkaloids, biological activity, Alzheimer's disease, cytotoxicity

The most important aim of this diploma thesis was to prepare summary alkaloid extracts from bulbs of the genus *Narcissus* L., specifically from seven cultivars *Narcissus* cv. MONDRAGON, RIP VAN WINKLE, SAGITTA, CHEERFULNESS, DOUBLE FASHION, PRECOCIOUS and FLOWER DRIFT, which were labeled as AL-458, AL-575, AL-443, AL-466, AL-549, AL-545 a AL-546. Samples were subsequently prepared for GC-MS analysis and screening determination of biological activities, namely the ability to inhibit human cholinesterases *h*AChE and *h*BuChE and cytotoxicity from these extracts.

Using GC-MS analysis a total of 20 alkaloids were identified by comparing their mass spektra with the literature or the NIST library. Identified alkaloids include lycorine, lycoramine, lycoraminone, anhydrolycorine, pankracine, caranine, *O*-acetyllycorine, pluvine, norpluvine, assoanine, haemanthamine, galanthine, incartine, *O*-methylpseudolycorine, hippeastrine, 8-*O*-demethylmaritidine, 1-*O*-acetylnorpluvine, cheryline and narcissidine. Homolycorine type alkaloids appeared to a large extent in individual extracts but it could not be further specified by GC-MS analysis.

The alkaloid extracts AL-546 and AL-575 were determined for *h*AChE inhibitory activity above 60 %. The most promising IC_{50} values compared to rivastigmine, galantamine HBr and berberine standards showed AL-575 aggregate extract against *h*AChE with IC_{50} value = 4.09 ± 0.52 μg/ml and AL-545 aggregate extract against *h*BuChE with IC_{50} value = 4.98 ± 1.46 μg/ml. This may be related with majority representation of galantamine in the AL-575 extract and in general, to the presence of galanthamine, lycorine and homolycorine alkaloids of the structural type which have been shown to show inhibitory activity against *h*AChE and *h*BuChE. The studied extracts were also screened for cytotoxic activity on the hepatocellular carcinoma cell line HepG2 at a concentration of 50 μg/ml. Extracts AL-549, AL-575 and AL-546 showed the most significant activity against tumor-transformed cells. This activity of AL-575 extract is very interesting due to its relatively strong inhibitory activity against *h*AChE.