

ABSTRACT

Rýdlová Kateřina: Alkaloids *Narcissus* 'Dutch Master' (Amaryllidaceae) and their biological activity III. Diploma thesis 2017. Charles university in Prague, Faculty of Pharmacy in Hradec Králové, Department of Pharmaceutical Botany and Ecology.

The aim of this work was isolation of compounds from the selected fraction ND 3 — 5 obtained by column chromatography of a *Narcissus* 'Dutch Master' alkaloid extract. Preparation of the extract and its column chromatography was performed by Mgr. Daniela Hulcová as a part of her doctoral study. Two substances NDM-1 and NDM-2 were isolated from fraction ND 3 — 5 by column chromatography and preparative TLC. The structures were determined as (+)-masonine and (+)-homolycorine on the basis of NMR, GC-MS analysis, optical rotation and their comparison with literature data.

Isolated alkaloids were tested on inhibitory activity against human erythrocyte acetylcholinesterase, plasma butyrylcholinesterase and prolyloligopeptidase. Activity of alkaloids was expressed as IC_{50} values: (+)-masonine ($IC_{50\text{ AChE}} = 305 \pm 34 \mu\text{M}$, $IC_{50\text{ BuChE}} = 229 \pm 24 \mu\text{M}$, $IC_{50\text{ POP}} = 314 \pm 34 \mu\text{M}$), (+)-homolycorine ($IC_{50\text{ AChE}} = 63.7 \pm 4.3 \mu\text{M}$, $IC_{50\text{ BuChE}} = 151 \pm 20 \mu\text{M}$, $IC_{50\text{ POP}} = 173 \pm 41 \mu\text{M}$). In comparison with standards of galanthamine ($IC_{50\text{ AChE}} = 1.710 \pm 0.1 \mu\text{M}$, $IC_{50\text{ BuChE}} = 42.3 \pm 1.3 \mu\text{M}$), huperzine A ($IC_{50\text{ AChE}} = 0.033 \mu\text{M}$, $IC_{50\text{ BuChE}} > 1000 \mu\text{M}$) and rivastigmine ($IC_{50\text{ AChE}} = 0.037 \mu\text{M}$, $IC_{50\text{ BuChE}} = 0.003 \mu\text{M}$) showed (+)-masonine mild inhibitory activity against cholinesterase, meanwhile (+)-homolycorine appeared as a moderate AChE inhibitor. Both alkaloids showed mild POP inhibition in comparison with standard Z-Pro-prolinaline ($IC_{50\text{ POP}} = 3.27 \text{ nM}$).

Key words: *Narcissus* 'Dutch Master', Amaryllidaceae, acetylcholinesterase, butyrylcholinesterase, prolyloligopeptidase, homolycorine alkaloids, Alzheimer's disease