

## Abstract

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**Title:** Amaryllidaceae alkaloids of *Narcissus poeticus* var. *recurvus* and their implication to Alzheimer's disease and anticancer activity

**Keywords:** Amaryllidaceae alkaloids, separation, isolation, lycorine, cherylline, galanthine, cholinesterase-inhibitory activity, cytotoxicity, *in silico* study.

An extensive phytochemical study was carried out on 29 kg of fresh bulbs of *Narcissus poeticus* var. *recurvus* based on preliminary results of the effects of alkaloid extract on *hAChE* and *hBuChE*. By processing the plant material, 36.4 g of alkaloidal extract was obtained, which was subsequently separated into 18 fractions by flash chromatography. The most abundant alkaloid in this plant, lycorine, was directly precipitated from the solution in a yield of 6.2 g. However, this thesis further focused on the processing of fraction 8, out of which two other alkaloids were obtained, namely galanthine (1.2 g) and cherylline (65.3 mg). MS, NMR analyses, and specific rotation elucidated the structures of all three alkaloids. Therefore, since Amaryllidaceae alkaloids are known biologically active compounds, three isolated compounds were subjected to *in vitro* analysis of *hAChE/hBuChE* inhibition activity and cytotoxicity screening (Jurkat, MOLT-4, A549, HT-29, PANC-1, A2780, SHSY5Y, MCF-7, SAOS-2, MRC-5 cell line, and human topoisomerase II $\alpha$ ). Cherylline exhibited good inhibitory activity against *hBuChE*, while was presented as no cytotoxic, and interesting results were observed for the MCF-7 cell line. In addition, *hAChE* activity was the subject of an *in silico* study to identify the interaction sites between the chemical scaffold and the enzymatic amino acid residues of isolated alkaloids.