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Steroidal glycosides from the aerial parts of *Avena sativa* and their cytotoxic activity

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Oats (*Avena sativa L.*) are a cereal grain worldwide and used as a livestock feed and food such as breakfast cereals, oatmeal porridge and hard cakes. Although a few steroidal glycosides, such as Avenacosides A and B and lignan derivatives were isolated from A. sativa, there has been no systematic investigation concerning the secondary metabolites of the plant. We conducted a phytochemical examination of *A. sativa* and evaluated the cytotoxic activity of the isolated compounds. The aerial parts of A. sativa were extracted with MeOH. The concentrated MeOH extract was passed through a Diaion HP-20 column, successively eluted with 30% MeOH, 50% MeOH, MeOH, EtOH and EtOAc. The MeOH eluate fraction showed cytotoxicity against HL-60 leukemia cells with an IC50 value of 16.8 μg/mL. Then, the MeOH eluate fraction was subjected to column chromatography on silica gel and octadecylsilanized silica gel and HPLC, giving compounds 1-12. The structures of the new compounds (1-6) were determined by analysis of their spectroscopic data and hydrolysis. Compounds 1-12 were evaluated for cytotoxic activity against HL-60 cells. Compounds 1, 9, 11 and 12 were cytotoxic to HL-60 cells with IC50 values ranging from 0.79 to 5.6 μM, whereas cisplatin, which was used as a positive control, gave an IC50 value of 1.49 μM. Compound 1 is a new Steroidal Glycoside with a potent cytotoxicity against HL-60 cells with an IC50 value of 0.79 μM. Then, the ability of apoptotic induction of 1 was evaluated. Compound 1 was revealed to induce apoptotic cell-death in HL-60 cells, which was shown by the morphologic and biochemical hallmarks of apoptosis such as fragmented and condensed nuclear chromatins, and a loss of mitochondrial membrane potential followed by the activation of caspase-3.

Biography

Akihito Yokosuka is an Assistant Professor in Department of Medicinal Pharmacognosy, School of Pharmacy, Tokyo University of Pharmacy and Life Sciences, Japan. He has completed his PhD from Tokyo University of Pharmacy and Life Sciences in 2004. His area of expertise includes pharmacognosy, phytochemistry and evaluation of natural products for medicinal uses.

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