Antiproliferative effect of phenylethanoid glycosides from *Verbena officinalis* L. on colon cancer cell lines

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Abstract

The cytotoxic effect of the aqueous extract from *Verbena officinalis*, was evaluated *in vitro* on DHD/K12/PROb rat colonic epithelial cell line and HCT-116 human colon adenocarcinoma cell line. In both cell lines, the IC_{50} values were lower than 20 μg/mL after 72 h of treatment. Bioassay guided fractionation led to the isolation of 12 phenylethanoid glycosides with anti-proliferative activity, five of them are being reported for the first time. The new compounds were elucidated as 4‴-acetyl-*O*-isoverbascoside, 2″,4″-diacetyl-*O*-verbascoside, 3‴,4‴-diacetyl-*O*-isoverbascoside, 4‴,6″-diacetyl-*O*-betonyoside A and 3‴,4‴-diacetyl-*O*-betonyoside A. The IC_{50} results suggest that antiproliferative activity is determined by not only the number of acetyl-groups but also their position in the aliphatic rings. Compounds exhibiting vicinal acetyl-groups in the sugar rings such as 3‴,4‴-diacetyl-*O*-isoverbascoside and 3‴,4‴-diacetyl-*O*-betonyoside A are particularly strong cytotoxic compounds against both cell lines. This investigation indicated that diacetyl-phenylethanoids might be valuable as cancer chemopreventive agents.