

Screening for Free Radical Scavenging and Cell Aggregation Inhibitory Activities by Secondary Metabolites from Turkish *Verbascum* species

I. Irem Tatli^{a,*}, Satoshi Takamatsu^b, Ikhlas A. Khan^b, and Zeliha S. Akdemir^c

^a Department of Pharmaceutical Botany, Faculty of Pharmacy, Hacettepe University, Sıhhiye, 06100, Ankara, Turkey. Fax: +90-312-3114777. E-mail: itatli@hacettepe.edu.tr

^b National Center for Natural Products Research, Research Institute of Pharmaceutical Sciences, School of Pharmacy, The University of Mississippi, University, 38677, MS, USA

^c Department of Pharmacognosy, Faculty of Pharmacy, Hacettepe University, Sıhhiye, 06100, Ankara, Turkey

* Author for correspondence and reprint requests

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Free radical scavenging and cell aggregation inhibitory activities of 36 secondary metabolites isolated from the methanolic extracts of *Verbascum cilicicum* Boiss., *V. lasianthum* Boiss. ex Benth., *V. pterocalycinum* var. *mutense* Hub.-Mor., and *V. salviifolium* Boiss. (Scrophulariaceae) were investigated. The isolated compounds, 6-*O*-vaniloyl ajugol (**1**), ilwensisaponin A (**2**), ilwensisaponin C (**3**), verbascoside (**4**), β -hydroxyacteoside (**5**), martynoside (**6**), polymoside (**7**), forsythoside B (**8**), angoroside A (**9**), dehydrodiconiferyl alcohol-9-*O*- β -D-glucopyranoside (**10**), dehydrodiconiferyl alcohol-9'-*O*- β -D-glucopyranoside (**11**), apigenin 7-*O*- β -glucopyranoside (**12**), luteolin 7-*O*- β -glucopyranoside (**13**), luteolin 3'-*O*- β -glucopyranoside (**14**) and chrysoeriol 7-*O*- β -glucopyranoside (**15**), exhibited a dose-dependent inhibition of bioautographic and spectrophotometric DPPH activities. Verbascoside (**4**) was the most active (IC₅₀ 4.0 μ g/ml) comparing it to vitamin C (IC₅₀ 4.4 μ g/ml) to inhibit phorbol 12-myristate 13-acetate (PMA)-induced peroxide-catalyzed oxidation of 2',7'-dichlorofluorescein (DCFH) by reactive oxygen species (ROS) within human promyelocytic HL-60 cells. Ilwensisaponin A (**2**) (MIC 6.9 μ g/ml) showed moderate *in vitro* activity on lymphocyte-associated antigen-1 (LFA-1)/intercellular adhesion molecule-1 (ICAM-1)-mediated aggregation using the HL-60 cell line [positive control was cytochalasin B (MIC 2.3 μ g/ml)]. None of the other compounds showed free radical scavenging and cell aggregation inhibitory activities.

Key words: *Verbascum* sp., Free Radical Scavenging Activity, Cell Aggregation Inhibitory Activity