



ELSEVIER

Contents lists available at ScienceDirect

Fitoterapia

journal homepage: www.elsevier.com/locate/fitote

Cytotoxic effect of triterpenoids from the root bark of *Hibiscus syriacus*

Li-Shian Shi^a, Chao-Hsuan Wu^b, Te-Chun Yang^c, Chen-Wen Yao^d, Hang-Ching Lin^{b,e},
Wen-Liang Chang^{b,*}

^a Department of Biotechnology, National Formosa University, Yunlin, Taiwan

^b School of Pharmacy, National Defense Medical Center, Taipei, Taiwan

^c Department of Pharmacy Practice, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan

^d Department of Pathology, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan

^e Sinphar Pharmaceutical Co., Ltd., I-Lan, Taiwan

ARTICLE INFO

Article history:

Received 13 January 2014

Accepted in revised form 14 May 2014

Available online xxxx

Chemical compounds studied in this article:

oleanolic acid (PubChem CID: 10494)

oleanolic acid-3-acetate (PubChem CID:

151202)

lupeol (PubChem CID: 73040)

betulin (PubChem CID: 72326)

betulinic acid (PubChem CID: 64971)

betulin-3-cafeate (PubChem CID: 10153267)

betulinic acid-3-cafeate (PubChem CID:

6439576)

β -sitosterol (PubChem CID: 222284)

β -sitosterol-3-O- β -D-glucoside (PubChem

CID: 70699351)

3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltet-

razolium bromide (PubChem CID: 64965)

Keywords:

Hibiscus syriacus L.

Triterpenoid

Cytotoxicity

Anticancer

ABSTRACT

In this study, 4 new triterpenoids—3 β - acetoxy-olean-11-en,28,13 β -olide (**1**), 3 β - acetoxy-11 α ,12 α -epoxy-olean-28,13 β -olide (**2**), 19 α -*epi*-betulin (**3**), and 20, 28-epoxy-17 β ,19 β -lupan-3 β -ol (**4**)—and 12 known compounds, were isolated from the root bark of *Hibiscus syriacus* L. by using acetone extraction. Their structures were characterized by extensive spectroscopic analysis. To investigate cytotoxicity, A549 human lung cancer cells were exposed to the extract and the compounds identified from it. Significantly reduced cell viability was observed with betulin-3-cafeate (**12**) (IC₅₀, 4.3 μ M). The results of this study indicate that betulin-3-cafeate (**12**) identified from *H. syriacus* L. may warrant further investigation for potential as anticancer therapies.

© 2014 Published by Elsevier B.V.

Abbreviations: EI, electron impact; NMR, nuclear magnetic resonance; MS, mass spectrometry; HR EI MS, high-resolution electron impact-mass spectrometry; MTT, 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide; FBS, fetal bovine serum; PCR, polymerase chain reaction; HPLC, high performance liquid chromatography; HMBC, heteronuclear multiple bond correlations; NOESY, nuclear Overhauser enhancement spectroscopy; NOE, nuclear Overhauser effect; COSY, correlation spectroscopy; HSQC, heteronuclear single quantum coherence.

* Corresponding author at: Graduate Institute of Pharmacy, National Defense Medical Center, No. 161, Sec. 6, Minquan E Rd. Neihu Dist, Taipei 114, Taiwan. Tel.: +886 2 87923100x18878; fax: +886 2 87923169.

E-mail address: wchang@ndmctsgh.edu.tw (W.-L. Chang).

<http://dx.doi.org/10.1016/j.fitote.2014.05.006>

0367-326X/© 2014 Published by Elsevier B.V.

Please cite this article as: Shi L-S, et al, Cytotoxic effect of triterpenoids from the root bark of *Hibiscus syriacus*, *Fitoterapia* (2014), <http://dx.doi.org/10.1016/j.fitote.2014.05.006>

1. Introduction

Hibiscus syriacus L. (Malvaceae) is a widely cultivated ornamental shrub, found throughout eastern and southern Asia. The root bark of *H. syriacus* L. has been used in Asian folk medicine as a fungicide, antipyretic, and anthelmintic in the treatment of dysentery, eczema, tinea, and scabies [1,2]. Several triterpenoids [3,4], cyclic peptides [5,6], feruloyltyramines, isoflavonoids [7], lignans [7,8], naphthalenes [9], sesquiterpenoids [10], and coumarins [8] have previously been identified in this plant. Crude extracts of *H. syriacus* and compounds isolated thereof have been reported to inhibit monoamine oxidase [8] and neutrophil elastase [10]; they also inhibit lipid peroxidation [4,9] and oxidation [7,8] and have cytotoxic effects [4,9,11].

The acetone extract of the *H. syriacus* root bark has a strong dose-dependent antiproliferative effect on human non-small cell lung cancer cells and induced apoptosis in human A549 lung cancer cells by suppressing the expression of p53 and apoptosis-induced factor [11]. To investigate the potential antitumor agents present in this Chinese herb, we prepared an acetone extract of *H. syriacus* in order to isolate and characterize

its constituents. This led to the isolation and characterization of 4 new compounds—3 β -acetoxy-olean-11-en-28,13 β -olide (1), 3 β -acetoxy-11 α ,12 α -epoxy-olean-28,13 β -olide (2), 19 α -epi-betulin (3), and 20,28-epoxy-17 β ,19 β -lupan-3 β -ol (4) (Fig. 1)—and 12 known compounds. Here, we have reported the isolation procedures and structural identification of compounds 1–4 and the cytotoxic activities of these and other compounds present in *H. syriacus* on the human lung cancer cell line A549.

2. Material and methods

2.1. General experimental procedures

Proton NMR spectra were recorded on Bruker Avance 500 (500 MHz) and AVIII 800 (800 MHz) spectrometers. The chemical shifts (ppm) were measured using tetramethylsilane (TMS) as an internal standard and deuterated chloroform as the solvent. Mass spectrometry was performed in the EI mode on a FINNIGAN MAT 95S spectrometer. Optical rotation was recorded using a JASCO DIP 370 polarimeter. Merck silica gel 60

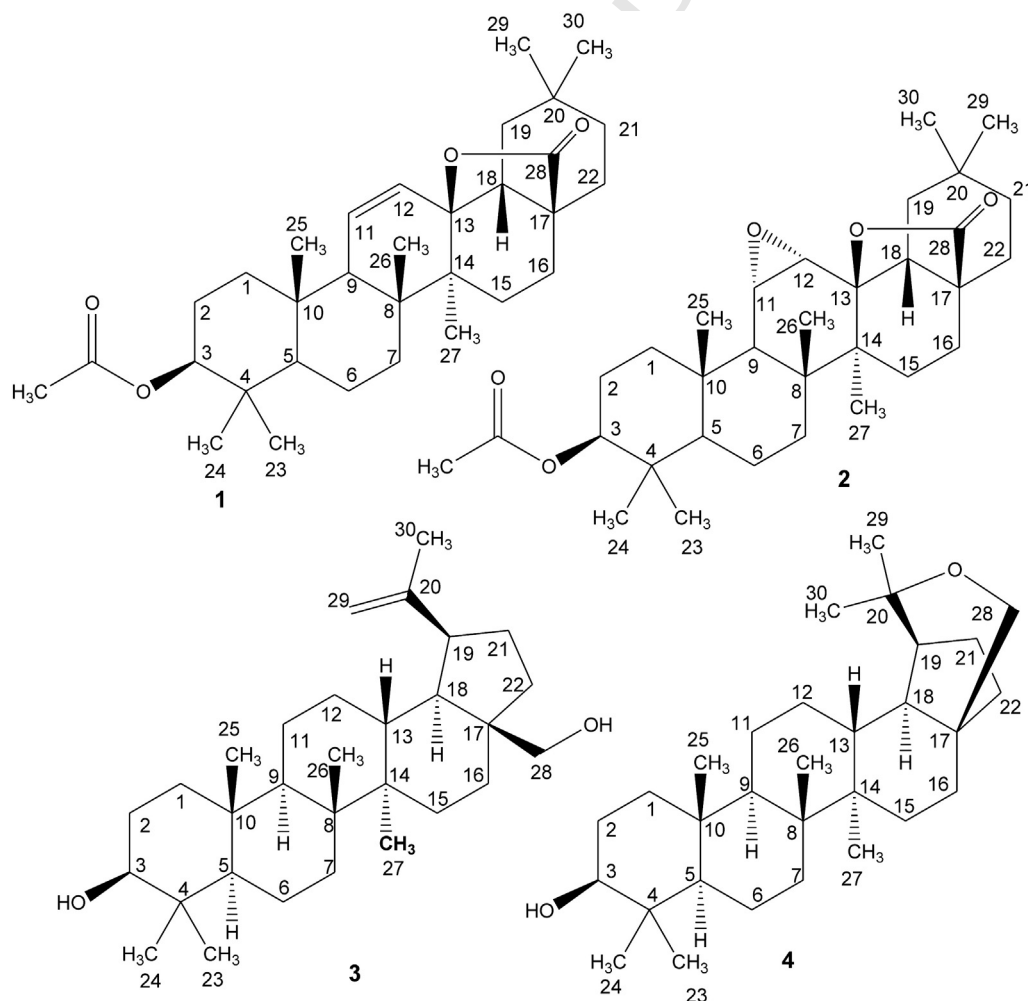


Fig. 1. Chemical structures of compounds 1–4.

Download English Version:

<https://daneshyari.com/en/article/5830844>

Download Persian Version:

<https://daneshyari.com/article/5830844>

[Daneshyari.com](https://daneshyari.com)