



Aporphine alkaloids, clerodane diterpenes, and other constituents from *Tinospora cordifolia*

Phan Van Kiem^{a,*}, Chau Van Minh^a, Nguyen Tien Dat^a, La Van Kinh^b, Dan Thuy Hang^a, Nguyen Hoai Nam^a, Nguyen Xuan Cuong^a, Hoang Thanh Huong^a, Trinh Van Lau^c

^a Laboratory of Organic Chemistry, Institute of Natural Products Chemistry, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam

^b Institute of Agricultural Science for Southern Vietnam, 121 Nguyen Binh Khiem, Ho Chi Minh City, Vietnam

^c National Institute of Drug Quality Control, 48 Hai Ba Trung, Hanoi, Vietnam

ARTICLE INFO

Article history:

Received 5 September 2009

Accepted in revised form 6 January 2010

Available online 15 January 2010

Keywords:

Tinospora cordifolia
Aporphine alkaloid
Clerodane diterpene
Phenylpropanoid
Tinoscorsides A–D

ABSTRACT

Phytochemical investigation of the methanol extract of *Tinospora cordifolia* aerial parts led to the isolation of four new and seven known compounds. The structures of two new aporphine alkaloids, *N*-formylasimilobine 2-*O*-β-*D*-glucopyranosyl-(1→2)-β-*D*-glucopyranoside (tinoscorside A, **1**) and *N*-acetylasimilobine 2-*O*-β-*D*-glucopyranosyl-(1→2)-β-*D*-glucopyranoside (tinoscorside B, **2**), a new clerodane diterpene, tinoscorside C (**3**), and a new phenylpropanoid, sinapyl 4-*O*-β-*D*-apiofuranosyl-(1→6)-*O*-β-*D*-glucopyranoside (tinoscorside D, **6**) were determined by extensive spectroscopic methods including FTICR-MS and 1D and 2D NMR.

© 2010 Elsevier B.V. All rights reserved.

1. Introduction

Tinospora cordifolia (Willd.) Miers (Menispermaceae) have been widely used in Vietnamese traditional medicine for the treatment of numerous diseases such as malaria, pharyngitis, rheumatism, and diabetes. Previous studies reported that the plant contained clerodane-diterpenes, alkaloids, and lignans with various biological activities including antihyperglycemia, antihyperlipidemia, antioxidant, antitumor, gastrointestinal and hepatoprotection, immunomodulation, and side effects prevention of the cancer chemotherapy [1]. In the present paper, we describe the isolation and structure elucidation of eleven compounds including two new aporphine alkaloids (1, 2), a new clerodane diterpene (3), and a new phenylpropanoid (6) from the methanol extract of *T. cordifolia* aerial parts. The known compounds were identified as borapetoside F (4) [2], borapetoside B (5) [3], syringin (7) [4], polypodine B 20,22-acetonide (8) [5], angelicoidenol 2-*O*-β-*D*-apiofuranosyl-

(1→6)-β-*D*-glucopyranoside [9] [6], secoisolariciresinol-9'-*O*-β-*D*-glucopyranoside [10] [7], and pinoresinol-di-*O*-glucoside (11) [8] by comparison of their NMR and ESI-MS data with the literature values (Fig. 1).

2. Experimental

2.1. General

ESIMS analyses: AGILENT 1200 LC-MSD Trap spectrometer. *HRMS*: Varian 910 FT-ICR mass spectrometer. *NMR spectra*: Bruker AM500 FT-NMR spectrometer using tetramethylsilane (TMS) as an internal standard. *TLC*: precoated Kieselgel 60 F₂₅₄ or RP₁₈ F_{254s} plates (Merck); detection 10% H₂SO₄ aqueous. *CC*: silica gel 230–400 mesh (Merck) or YMC RP-18 resins (30–50 μm, Fujisilisa Chemical Ltd.).

2.2. Plant material

The aerial parts of *T. cordifolia* (Willd.) Miers (Menispermaceae) were collected at Bach Ma National Park, Vietnam in October 2008 and identified by Dr. Ninh Khac Ban, Institute of

* Corresponding author. Tel.: +84 4 37560793; fax: +84 4 37564390.
E-mail address: phankiem@vast.ac.vn (P. Van Kiem).

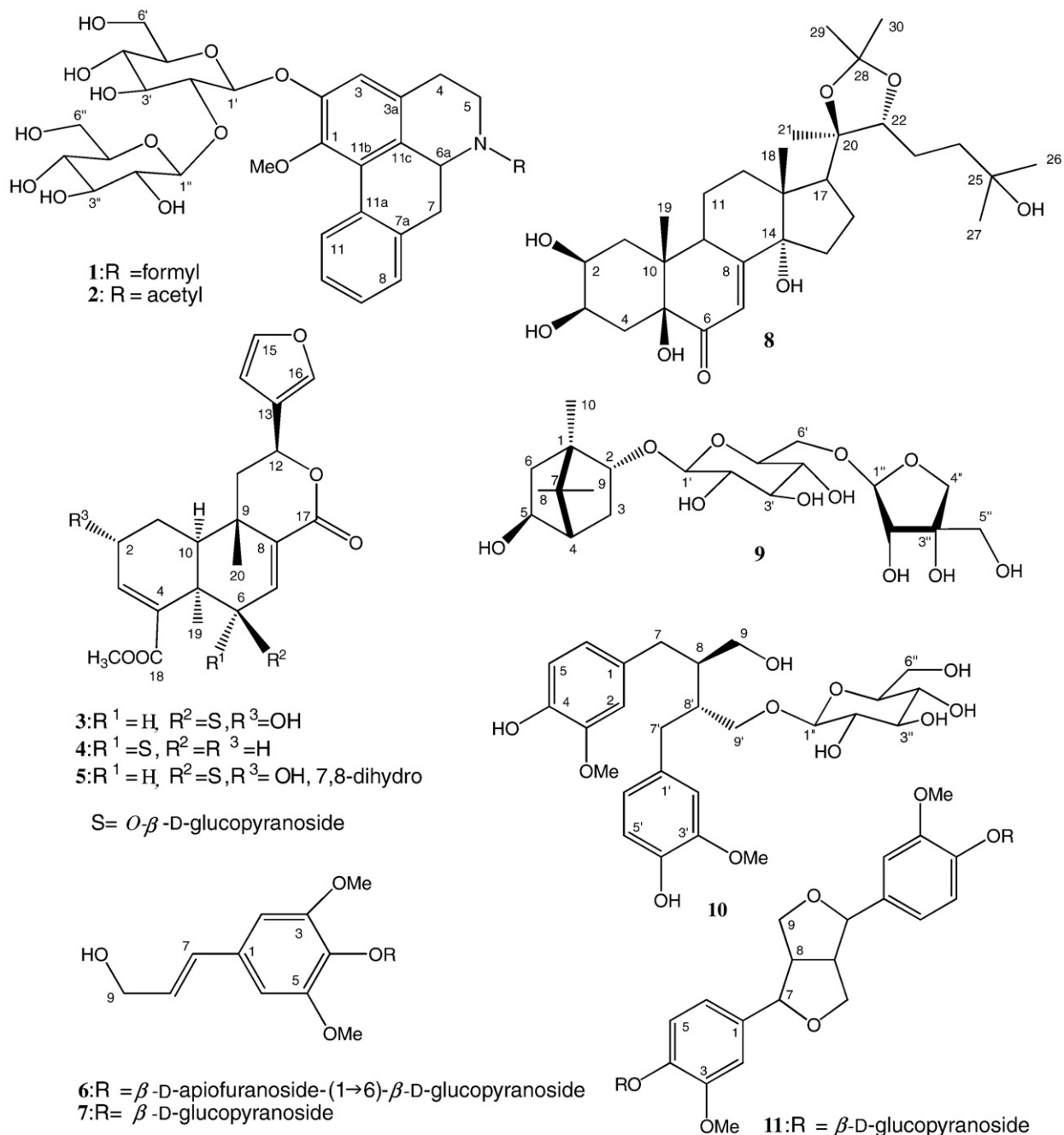


Fig. 1. Structures of 1–11.

Ecology and Biological Resources, Vietnam Academy of Science and Technology (VAST). A voucher specimen (No KC10-40) was deposited at the herbarium of the Institute of Natural Products Chemistry, VAST, Vietnam.

2.3. Extraction and isolation

The air-dried and powdered aerial parts of *T. cordifolia* (2 kg) were extracted with MeOH (10 L × 3) and then the solvent was

removed under low pressure to obtain 100 g MeOH residue. This was suspended in water (2 L) and then partitioned with ethyl acetate (2 L × 3). The ethyl acetate extract was concentrated under low pressure to give 45 g residue. The water layer was passed through a dianion column eluting with 50%, 75%, and 100% MeOH to afford three fractions, FA1–FA3. The FA1 was chromatographed on a silica column eluting with CHCl₃–MeOH–H₂O (30:10:1, v/v/v) to afford compounds **6** (4.5 mg) and **9** (5.0 mg). Compound **7** (19.5 mg) was isolated from FA2 by a

Download English Version:

<https://daneshyari.com/en/article/2539213>

Download Persian Version:

<https://daneshyari.com/article/2539213>

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