IRIDAL-TYPE TRITERPENOID DERIVATIVES AND ISOFLAVONOIDS FROM BELAMCANDA CHINENSIS ROOTS

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Abstract:

Belamcanda chinensis (L.) DC is a popular ornamental and medicinal plant belonging to the Iridaceae family. Its rhizomes are used in Vietnamese traditional medicine for the treatment of inflammation and respiratory disorders, such as asthma, tonsillitis, coughing, and pharyngitis. In this study, four iridal-type triterpenoid derivatives (**1–4**) and four isoflavonoids (**5–8**) have been isolated from the methanol extract of *Belamcanda chinensis* roots. The structures of the isolated compounds were determined using NMR spectroscopic analysis combined with comparison with the literature and were found to be isoiridogermanal (**1**), iridobelamal A (**2**), 16-*O*-acetylisoiridogermanal (**3**), 16-*O*-acetyliridobelamal A (**4**), irigenin (**5**), irisflorentin (**6**), irilin D (**7**), and tectoridin (**8**).

Keywords: *Iridal-type triterpenoid; Isoflavonoid; Iridaceae; Belamcanda chinensis.*

1. Introduction

The Iridaceae family consists of about 60 genera and 800 species worldwide. *Belamcanda chinensis* (L.) DC (Iridaceae family), is a perennial herbaceous plant and widely distributed in Vietnam, China, Japan, and Korea (Woźniak and Matkowski, 2015). In traditional medicine, *B. chinensis* has been used for the treatment of pharyngitis, coughing, bronchitis, and chronic tracheitis by reducing pharyngeal swelling, heat-clearing, and detoxifying (Liu et al., 2012; Zhang et al., 2016). Previous chemical investigations on *B. chinensis* had discovered its chemical components, including isoflavonoids, flavonoids, benzoquinones, iridal-type triterpenoids, phenols, and steroids (Woźniak and Matkowski, 2015; Zhang et al., 2016). Among them, the isoflavonoids and iridal-type triterpenoids from *B. chinensis* show diverse biological activities, such as anti-inflammatory, antioxidant, anti-tumor, hepatoprotective, anti-diabetic, anti-mutagenic, neuroprotective, and antibacterial activities (Li et al., 2019b; Liu et al., 2012; Woźniak and Matkowski, 2015; Zhang et al., 2016). In this present study, repeated chromatography of the CH_2Cl_2 fractions from the methanol extract of *Belamcanda chinensis* roots led to the isolation of four iridal-type triterpenoid derivatives (**1–4**) and four isoflavonoids (**5–8**). Their structures were elucidated based on ^1H and ^{13}C NMR data comparison with the literature.

2. Research overview

Up to now, although there have been many

studies on *B. chinensis*, with the diversity of chemical constituents as well as the promising biological effects of the *B. chinensis* compounds, this plant still attracts a lot of research attention from scientists. Recently, cytotoxic and anti-inflammatory stilbenes and phenolic compounds were isolated for the first time from Chinese *B. chinensis* (Guo et al., 2023; Liu et al., 2022). In addition, the polysaccharides were also recently isolated and characterized from the rhizomes of *Chinese B. chinensis*, which act as potential complement inhibitors to treat diseases involving excessive activation of the complement system (Duan et al., 2022). However, the number of studies on the chemical constituents and biological activity of Vietnamese *B. chinensis* are limited. Among the few published studies on Vietnamese *B. chinensis*, Do et al. have reported the isolation of three new flavonoids and one new sucrosephenylpropanoid ester from the *B. chinensis* aerial part with the good regulation of the growth and proliferation of vascular smooth muscle cells (Do et al., 2019). Iridal-type triterpenoids are well-known as the main constituent of *B. chinensis*, which are structurally characterized by a multisubstituted cyclohexane ring with an α,β-unsaturated aldehyde functional group, and a homofarnesyl side chain (Li et al., 2019a). Since the fascinating structures and diverse biological activities, iridal-type triterpenoids have attracted the attention of both organic chemists and pharmacologists.

3. Materials and methods

3.1 General experimental procedures

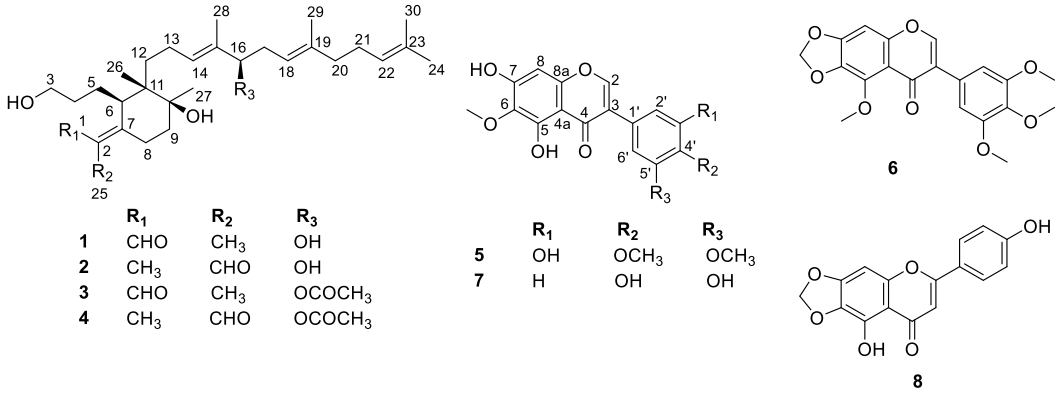
Nuclear magnetic resonance (NMR) spectra were recorded using a Bruker AV-400 spectrometer (Bruker Corporation, Switzerland) in ppm rel. to tetramethylsilane (TMS) as internal standard. Reversed-phase (RP)-C18 silica gel (Merck, 75 mesh), silica gel 60 (Merck, 230−400 mesh), and Sephadex LH-20 (Pharmacia Company) were used for column chromatography. Thin-layer chromatography (TLC) was performed using Merck precoated silica gel F_{254} plates and RP C-18 F_{254s} plates. The spots were detected by spraying with an aqueous solution of H_2SO_4 5% followed by heating with a heat gun.

3.2 Extraction and isolation

The roots of *B.chinensis* were collected in Nghe An province (Vietnam), in June 2022. The dried roots (1.5 kg) were extracted using methanol (3 × 5L), and the extract was evaporated in vacuum until dryness. The crude extract (250 g) was suspended in distilled water (1L) and then successively partitioned with CH_2Cl_2 and EtOAc. The CH_2Cl_2 fraction (223 g) was subjected to silica gel column chromatography (CC) using a stepwise gradient of CH_2Cl_2-MeOH (100:1 to 0:1, v/v) to yield ten fractions (BC1-BC10). Fraction BC8 (25 g) was fractioned by silica gel CC eluted with a solvent system of *n*-hexane-acetone (5:1, v/v) to yield six fractions (BC8.1–BC8.6). Fraction BC8.5 (12.5 g) was purified using silica gel CC (CH_2Cl_2-acetone, 15:1, v/v) to afford compounds **6** (1.2 g) and **5** (150 mg). Fraction BC10 (3.2 g) was separated by silica gel CC eluted with a solvent system of CH_2Cl_2-acetone (15:1, v/v) to yield nine fractions (BC10.1–BC10.10). Compounds **3** (5.5 mg) and **4** (6 mg) were obtained from fraction BC10.6 (546 mg) by RP-18 silica gel CC eluting with a mixture of MeOH-H_2O (3:1, v/v). Fraction BC10.9 (1.1 g) was fractioned by silica gel CC with CH_2Cl_2-acetone (8:1, v/v) as the mobile phase to yield four fractions (BC10.9.1–BC10.9.4). Fraction BC10.934 (513 mg) was subjected to silica gel CC eluted with a mixture of CH_2Cl_2-MeOH (15:1, v/v) to yield compounds **1** (17 mg) and **2** (11 mg). Fraction BC9 (8.2 g) was chromatographed on a silica gel column eluted with a gradient solvent system of CH_2Cl_2-EtOAc (10:1 to 3:1, v/v) to yield nine fractions (BC9.1–C9.9). Fraction BC9.5 (257 mg) was separated using a Sephadex LH-20 column with MeOH-H_2O (2:1, v/v) as the mobile phase to yield compounds **7** (5 mg) and **8** (5 mg).

4. Results

Fig.1. Chemical structures of compounds **1–8** isolated from *B. chinensis* roots.



The methanolic extract of the *B. chinensis* roots was repeatedly separated by column chromatography over silica gel, RP-silica gel, or Sephadex LH-20, followed by preparative HPLC to afford four iridal-type triterpenoid derivatives (**1–4**) and four isoflavonoids (**5–8**), including isoiridogermanal (**1**), iridobelamal A (**2**), 16-*O*-acetylisoiridogermanal (**3**), 16-*O*-acetyliridobelamal A (**4**), irigenin (**5**), irisflorentin (**6**), irilin D (**7**), and tectoridin (**8**). The NMR spectroscopic data of all the isolated compounds were listed as follows:

4.1. Isoiridogermanal (1)

Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 10.13 (1H, s, -CHO-1), 5.21 (1H, t, J = 7.2 Hz, H-14), 5.03 (1H, t, J = 7.2 Hz, H-22), 5.03 (1H, t, J = 7.2 Hz, H-18), 3.88 (1H, dd, J = 7.6, 5.6 Hz, H-16), 3.55 (2H, t, J = 6.8 Hz, H_2-3), 3.28 (1H, d, J = 10.8 Hz, H-6), 1.79 (3H, s, CH_3-25), 1.64 (3H, s, CH_3-24), 1.58 (3H, s, CH_3-30), 1.56 (3H, s, CH_3-29), 1.51 (3H, s, CH_3-28), 1.11 (3H, s, CH_3-27), 1.06 (3H, s, CH_3-26). ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 190.2 (-CHO-1), 163.3 (C-7), 138.6 (C-15), 137.0 (C-19), 133.1 (C-2), 131.6 (C-23), 125.4 (C-14), 124.1 (C-22), 120.0 (C-18), 76.7 (C-16), 75.0 (C-10), 62.8 (C-3), 45.1 (C-11), 43.4 (C-6), 39.8 (C-20), 36.9 (C-4), 36.9 (C-9), 34.2 (C-17), 32.6 (C-12), 26.7 (C-5), 26.6 (C-21), 26.2 (C-27), 25.7 (CH_3-24), 23.9 (C-8), 21.8 (C-13), 18.0 (CH_3-26), 17.7 (CH_3-30), 16.3 (CH_3-29), 11.9 (CH_3-28), 11.0 (CH_3-25).

4.2. Iridobelamal A (2)

Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 10.18 (1H, s, -CHO-1), 5.23 (1H, t, J = 7.2 Hz, H-14), 5.05 (1H, t, J = 7.2 Hz, H-22), 5.03 (1H, t, J = 7.2 Hz, H-18), 3.90 (1H, dd, J = 7.6, 5.6 Hz, H-16), 3.55 (2H, t, J = 6.8 Hz, H_2-3), 3.18 (1H, d, J = 10.8 Hz, H-6), 1.76 (3H, s, CH_3-25), 1.64 (3H, s, CH_3-24), 1.58 (3H, s, CH_3-30), 1.56 (3H, s, CH_3-29), 1.56 (3H, s, CH_3-28), 1.12 (3H, s, CH_3-27), 1.05 (3H, s, CH_3-26). ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 190.8 (-CHO-1), 164.0 (C-7), 138.7 (C-15), 136.9 (C-19), 133.0 (C-2), 131.6 (C-23), 125.8 (C-14), 124.1 (C-22), 119.9 (C-18), 76.8 (C-16), 75.1 (C-10), 63.1 (C-3), 47.4 (C-6), 45.3 (C-11), 39.8 (C-20), 37.9 (C-9), 36.9 (C-12), 34.2 (C-17), 32.0 (C-4), 27.2 (C-5), 26.6 (C-21), 26.2 (C-27), 25.7 (CH_3-24), 23.0 (C-13), 20.1 (C-8), 17.8 (CH_3-30), 17.7 (CH_3-26), 16.3 (CH_3-29), 11.9 (CH_3-28), 11.9 (CH_3-25).

4.3. 16-O-acetylisoiridogermanal (3)

Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 10.16 (1H, s, -CHO-1), 5.25 (1H, t, J = 7.2 Hz, H-14), 5.05 (1H, t, J = 7.2 Hz, H-22), 5.05 (1H, m, H-16), 4.95 (1H, t, J = 7.2 Hz, H-18), 3.59 (2H, t, J = 6.8 Hz, H_2-3), 3.29 (1H, d, J = 11.2 Hz, H-6), 2.00 (3H, s, CH_3-32), 1.82 (3H, s, CH_3-25), 1.66 (3H, s, CH_3-24), 1.57 (3H, s, CH_3-30), 1.56 (3H, s, CH_3-29), 1.51 (3H, s, CH_3-28), 1.13 (3H, s, CH_3-27), 1.07 (3H, s, CH_3-26). ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 190.0 (-CHO-1), 170.4 (C-31), 162.8 (C-7), 137.8 (C-19), 133.0 (C-2), 133.2 (C-15), 131.4 (C-23), 128.7 (C-14), 124.2 (C-22), 119.2 (C-18), 79.2 (C-16), 75.0 (C-10), 63.1 (C-3), 44.8 (C-11), 43.5 (C-6), 39.8 (C-20), 37.1 (C-4), 36.8

(C-9), 32.9 (C-12), 31.6 (C-17), 26.7 (C-5), 26.7 (C-21), 26.3 (C-27), 25.8 (CH_3-24), 23.9 (C-8), 21.9 (C-13), 21.4 (CH_3-32), 18.0 (CH_3-26), 17.8 (CH_3-30), 16.3 (CH_3-29), 11.9 (CH_3-28), 11.0 (CH_3-25).

4.4. 16-O-acetylisoiridobelamal A (4)

Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 10.22 (1H, s, -CHO-1), 5.25 (1H, t, J = 7.2 Hz, H-14), 5.05 (1H, t, J = 7.2 Hz, H-22), 5.05 (1H, m, H-16), 4.96 (1H, t, J = 7.2 Hz, H-18), 3.59 (2H, t, J = 6.8 Hz, H_2-3), 2.77 (1H, d, J = 11.2 Hz, H-6), 2.00 (3H, s, CH_3-32), 1.78 (3H, s, CH_3-25), 1.66 (3H, s, CH_3-24), 1.58 (3H, s, CH_3-30), 1.58 (3H, s, CH_3-29), 1.57 (3H, s, CH_3-28), 1.14 (3H, s, CH_3-27), 1.06 (3H, s, CH_3-26). ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm): 190.8 (-CHO-1), 170.5 (C-31), 163.5 (C-7), 137.9 (C-19), 133.2 (C-2), 133.1 (C-15), 131.5 (C-23), 128.3 (C-14), 124.3 (C-22), 119.2 (C-18), 79.1 (C-16), 75.2 (C-10), 63.3 (C-3), 47.5 (C-6), 45.4 (C-11), 39.8 (C-20), 38.0 (C-9), 36.8 (C-12), 32.1 (C-17), 31.6 (C-4), 27.3 (C-5), 26.8 (C-21), 26.4 (C-27), 25.8 (CH_3-24), 23.1 (C-13), 21.4 (CH_3-32), 20.1 (C-8), 17.9 (CH_3-30), 17.8 (CH_3-26), 16.4 (CH_3-29), 12.2 (CH_3-28), 12.0 (CH_3-25).

4.5. Irigenin (5)

Yellow, amorphous powder; ^{1}H NMR (400 MHz, DMSO-d_6) δ (ppm): 8.37 (1H, s, H-2), 6.71 (1H, s, H-6′), 6.66 (1H, s, H-2′), 6.50 (1H, s, H-8), 3.78 (3H, s, -OCH_3-6), 3.75 (3H, s, -OCH_3-4′), 3.69 (3H, s, -OCH_3-5′). ^{13}C NMR (100 MHz, DMSO-d_6) δ (ppm): 180.2 (C-4), 157.5 (C-7), 154.7 (C-5′), 153.2 (C-2), 152.8 (C-5), 152.6 (C-8a), 150.2 (C-3′), 136.4 (C-4′), 131.4 (C-6), 126.0 (C-1′), 121.7 (C-3), 110.3 (C-2′), 104.8 (C-4a), 104.5 (C-6′), 93.9 (C-8), 59.9 (-OCH_3-4′, 6), 55.8 (-OCH_3-5′).

4.6. Irisflorentin (6)

Yellow, amorphous powder; ^{1}H NMR (400 MHz, DMSO-d_6) δ (ppm): 8.03 (1H, s, H-2), 7.00 (1H, s, H-8), 6.83 (2H, s, H-2′, 6′), 6.18 (2H, s, H-9), 3.90 (3H, s, -OCH_3-5), 3.79 (6H, s, -OCH_3-3′, 5′), 3.68 (3H, s, -OCH_3-4′). ^{13}C NMR (100 MHz, DMSO-d_6) δ (ppm): 173.7 (C-4), 153.8 (C-2), 152.6 (C-7), 152.4 (C-3′, 5′), 152.0 (C-8a), 140.5 (C-5), 137.3 (C-4′), 135.9 (C-6), 127.5 (C-1′), 124.1 (C-3), 113.1 (C-4a), 106.7 (C-2′, 6′), 102.6 (C-9), 93.5 (C-8), 60.7 (-OCH_3-5), 60.0 (-OCH_3-4′), 55.9 (-OCH_3-3′, 5′).

4.7. Irilin D (7)

Yellow, amorphous powder; ^{1}H NMR (400 MHz, methanol-d_4) δ (ppm): 8.16 (1H, s, H-2), 7.14 (1H, d, J = 2.0 Hz, H-2′), 6.94 (1H, dd, J = 8.0, 2.0 Hz, H-6′), 6.88 (1H, d, J = 8.0 Hz, H-5′), 6.49 (1H, s, H-8), 3.87 (3H, s, -OCH_3-6). ^{13}C NMR (100 MHz, methanol-d_4) δ (ppm): 182.0 (C-4), 157.8 (C-7), 154.5 (C-5), 154.5 (C-2), 154.2 (C-8a), 146.2 (C-4′), 145.6 (C-3′), 132.1 (C-6), 123.6 (C-1′), 123.5 (C-3), 121.5 (C-6′), 117.2 (C-2′), 115.9 (C-5′), 106.5 (C-4a), 94.3 (C-8), 60.6 (-OCH_3-6).

4.8. Tectoridin (8)

Yellow, amorphous powder; ^{1}H NMR (400 MHz, DMSO-d_6) δ (ppm): 8.37 (1H, s, H-2), 7.34 (2H, d, J = 8.4 Hz, H-2′, 6′), 6.77 (2H, d, J = 8.4 Hz, H-3′, 5′), 6.82 (1H, s, H-8), 3.70 (3H, s, -OCH_3-6), 5.05 (1H, d, J = 7.2 Hz, H-1″), 3.65, 3.42 (each 1H, m, H_2-6″), 3.58 (1H, m, H-3″), 3.42 (1H, m, H-5″), 3.26 (1H, m, H-2″), 3.14 (1H, m, H-4″). ^{13}C NMR (100 MHz, DMSO-d_6) δ (ppm): 180.8 (C-4), 157.5 (C-4′), 156.6 (C-7), 154.7 (C-2), 152.8 (C-5), 152.5 (C-8a), 132.4 (C-6), 130.2 (C-2′, 6′), 122.1 (C-1′), 121.1 (C-3), 115.1 (C-3′, 5′), 106.5 (C-4a), 100.1 (C-1″), 94.0 (C-8), 77.3 (C-5″), 76.7 (C-3″), 73.1 (C-2″), 69.7 (C-4″), 60.7 (CH_2-6″), 60.3 (-OCH_3-6).

5. Discussions

*Structural elucidation of compounds **1–8***

Isoiridogermanal (**1**) was obtained as colorless oil. The ^{1}H NMR spectrum of **1** exhibited signals of an aldehyde group at δ_H 10.13 (1H, s, -CHO-1); three olefinic protons at δ_H 5.21 (1H, t, J = 7.2 Hz, H-14), 5.03 (1H, t, J = 7.2 Hz, H-22), and 5.03 (1H, t, J = 7.2 Hz, H-18), suggesting the presence of a homofarnesyl side chain; and seven methyls at δ_H 1.79 (3H, s, CH_3-25), 1.64 (3H, s, CH_3-24), 1.58 (3H, s, CH_3-30), 1.56 (3H, s, CH_3-29), 1.51 (3H, s, CH_3-28), 1.11 (3H, s, CH_3-27), 1.06 (3H, s, CH_3-26). Thirty carbon resonances were observed

from the ^{13}C NMR data, including one aldehyde carbon at δ_C 190.2 (-CHO-1); eight olefinic carbons at δ_C 163.3 (C-7), 138.6 (C-15), 137.0 (C-19), 133.1 (C-2), 131.6 (C-23), 125.4 (C-14), 124.1 (C-22), and 120.0 (C-18); three oxygenated carbons at δ_C 76.7 (C-16), 75.0 (C-10), and 62.8 (C-3); and 18 sp^3 carbons. All the ^1H NMR and ^{13}C NMR data were characteristic of an iridal-type triterpenoid (Li et al., 2019a; Takahashfi et al., 2000). Based on the above analysis and the comparison with literature data, (Takahashfi et al., 2000) the structure of **1** was determined as isoiridogermanal as shown in Figure 1.

Iridobelamal A (**2**) was obtained as a colorless oil. Similar to **1**, the ^1H and ^{13}C NMR data of **2** also revealed that this compound was an iridal-type triterpenoid with the characteristic signals of an aldehyde group at δ_H/δ_C 10.18 (1H, s, -CHO-1)/190.8 and a homofarnesyl side chain (Li et al., 2019). The NMR data of **1** and **2** was very similar, except for the difference of the ^{13}C NMR chemical shifts at position 6 and 8 [an upfield shift of C-8 (Δδ 3.8) and a downfield shift of C-6 (Δδ 4.0)] in comparison with the corresponding signals of **1**. These differences demonstrated that **2** and **1** were a pair of geometrical isomers of *α,β*-unsaturated aldehyde group (Takahashfi et al., 2000). Thus, the structure of **2** (iridobelamal A) was determined as shown in Figure 1.

16-*O*-Acetylisoiridogermanal (**3**) was obtained as colorless oil. Like compounds **1** and **2**, the ^1H NMR data of **3** also revealed the characteristic signals of an aldehyde group [δ_H 10.16 (1H, s, -CHO-1)], three nonconjugated olefinic protons [δ_H 5.25 (1H, t, J = 7.2 Hz, H-14), 5.05 (1H, t, J = 7.2 Hz, H-22), and 4.95 (1H, t, J = 7.2 Hz, H-18)], one oxygenated methylene group [δ_H 3.59 (2H, t, J = 6.8 Hz, H_2-3)] five vinyl methyl groups [δ_H 1.82 (3H, s, CH_3-25), 1.66 (3H, s, CH_3-24), 1.57 (3H, s, CH_3-30), 1.56 (3H, s, CH_3-29), and 1.51 (3H, s, CH_3-28)], and two tertiary methyl groups [δ_H 1.13 (3H, s, CH_3-27) and 1.07 (3H, s, CH_3-26)]. The ^1H NMR and ^{13}C NMR spectra of **3** closely resembled those of **1**, except for the additional signals of one acetyl group at δ_H/δ_C 2.00 (3H, s, CH_3-32)/21.4 and δ_C 170.4 (C-31). These spectral features suggested that compound **3** was the acetyl derivative of **1**. By comparison with literature data (Takahashfi et al., 2000), the structure of **3** was determined as 16-*O*-acetylisoiridogermanal as shown in Figure 1. By the same analysis method as applied to compound **3**, compound **4** was determined to be 16-*O*-acetyliridobelamal A, the acetyl derivative of **2**.

Irigenin (**5**) was obtained as a yellow, amorphous powder. The ^1H NMR and ^{13}C NMR spectra of **1** showed typical signals of one isoflavonoid derivative including one olefinic proton at δ_H 8.37 (1H, s, H-2) one carbonyl group at δ_C 180.2 (C-4). In addition, one remaining olefinic proton at δ_H 6.50 (1H, s, H-8) and one AX coupling system at 6.71 (1H, s, H-6′) and 6.66 (1H, s, H-2′), together with two methoxy groups at δ_H 3.78 (3H, s, -OCH_3-6), 3.75 (3H, s, -OCH_3-4′), and 3.69 (3H, s, -OCH_3-5′) were also observed in the ^1H NMR spectrum of **1**. The ^{13}C NMR spectrum of **5** showed eighteen carbon resonances including one carbonyl group at δ_C 180.2 (C-4), three methoxy groups at 59.9 (-OCH_3-4′, 6) and 55.8 (-OCH_3-5′), and fourteen olefinic carbons. Based on the above analysis and the comparison with literature data,(Ito et al., 2001) the structure of **3** was determined as irigenin (**5**), a major isoflavonoid of *B. chinensis* (Figure 1). Similar to that, ^1H NMR and ^{13}C NMR spectra of compounds **6–8** also exhibited characteristic signals of isoflavonoid derivatives. By NMR spectroscopic analysis and comparison with literature data, their structures were determined to be irisflorentin (**6**) (Monthakantirat et al., 2005), irilin D (**7**) (Choudhary et al., 2001), and tectoridin (**8**) (QIN et al., 2005)

6. Conclusions

In conclusion, the phytochemical investigation of the methanol extract of *B.*

chinensis roots led to the isolation of four iridal-type triterpenoid derivatives (**1–4**) and four isoflavonoids (**5–8**). Based on the analysis of their observed and reported spectroscopic data, their structures were identified as isoiridogermanal (**1**), iridobelamal A (**2**), 16-*O*-acetylisoiridogermanal (**3**), 16-*O*-acetyliridobelamal A (**4**), irigenin (**5**), irisflorentin (**6**), irilin D (**7**), and tectoridin (**8**). The isoflavonoids and iridal-type triterpenoids from *B. chinensis* show fascinating structures and diverse biological activities including anti-inflammatory, antioxidant, anti-tumor, hepatoprotective, anti-diabetic, anti-mutagenic, neuroprotective, and antibacterial activities. Therefore, further studies on the chemical constituents of *B. chinensis* roots to find out new metabolites as well as investigation of other biological activities of the isolated compounds are needed.

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CÁC HỢP CHẤT TRITERPENOID DẠNG IRIDAL VÀ CÁC HỢP CHẤT ISOFLAVONOID ĐƯỢC PHÂN LẬP TỪ RỄ CỦA LOÀI RẺ QUẠT (BELAMCANDA CHINENSIS)

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Tóm tắt:

*Cây rẻ quạt có tên khoa học là Belamcanda chinensis (L.) DC, là cây hoa cảnh và cây thuốc thuộc họ La dơn (Iridaceae). Thân rễ của loài được sử dụng trong y học cổ truyền Việt Nam để điều trị các chứng viêm và rối loạn hô hấp như hen suyễn, viêm amidan, ho và viêm họng. Trong nghiên cứu này, bốn hợp chất triterpenoid dạng iridal (**1–4**) và bốn hợp chất isoflavonoid (**5–8**) đã được phân lập từ dịch chiết methanol của rễ cây rẻ quạt. Cấu trúc của các hợp chất được phân lập đã được xác định bằng các phương pháp phân tích phổ cộng hưởng từ hạt nhân NMR kết hợp với so sánh với các dự liệu phổ trong tài liệu tham khảo. Các hợp chất được phân lập bao gồm: isoiridogermanal (**1**), iridobelamal A (**2**), 16-O-acetylisoiridogermanal (**3**), 16-O-acetyliridobelamal A (**4**), irigenin (**5**), irisflorentin (**6**), irilin D (**7**), and tectoridin (**8**).*

Từ khóa: *Iridal-type triterpenoid; Isoflavonoid; La dơn; Rẻ quạt.*