1 **Supplementary material**

2 **Iridoid glycosides from *Callicarpa nudiflora* Hook**

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Iridoid glycosides from *Callicarpa nudiflora* Hook

Four new iridoid glycosides (1–4), along with ten known iridoid glycosides (5–14) were isolated from *Callicarpa nudiflora* Hook et Arn.. The structure of the new iridoid glycosides were elucidated as 5"-methoxy-ampicoside (1), 6"-*O*-trans-caffeoylcatalpol (2), 6"-*O*-trans-feruloylcatalpol (3), and 3"-methoxy-agnucastaside C (4) on the basis of spectroscopic analysis. Compounds 1–11 were reported from this plant for the first time. The cytotoxic activity of the isolated compounds against human cervical carcinoma Hela cells and ovarian carcinoma HeyA8 cells was evaluated using the MTT assay. Compounds 4, 5, 8, 12 and 13 showed cytotoxic activity against the Hela cell line with IC₅₀ values of 25.3, 48.1, 17.3, 38.3 and 28.2 μM, respectively. While only compound 8 showed cytotoxicity against the HeyA8 cell line, with an IC₅₀ of 35.5 μM.

Keywords: *Callicarpa nudiflora*; iridoid glycosides; cytotoxic activity.

1. Experimental date

1.1. 10-*O*-(*E*)-*p*-coumaroylgeniposidic acid (5)

White amorphous powder, ESI-MS: m/z 543.1 [M + Na]⁺, 1062.9 [2M + Na]⁺, 519.7 [M – H][–] and 1039.2 [2M – H][–].

¹H NMR (CD₃OD-*d*₄, 500 MHz) δ: 5.19 (1H, d, *J* = 7.8 Hz, H-1), 7.54 (1H, s, H-3), 3.24 (1H, m, H-5), 2.08 (1H, m, H-6a), 2.26 (1H, m, H-6b), 5.71 (1H, d, *J* = 15.5 Hz, H-7), 3.00 (1H, m, H-9), 5.00 (2H, m, H-10), 4.77 (1H, d, *J* = 7.5 Hz, glu-H-1'), 3.69 (1H, dd, *J* = 12.0, 6.0 Hz, glu-H-6'a), 3.94 (1H, d, *J* = 10.5 Hz, glu-H-6'b), 7.46 (2H, d, *J* = 8.5 Hz, H-2'', 6''), 6.82 (2H, d, *J* = 8.5 Hz, H-3'', 5''), 7.62 (1H, d, *J* = 16.0 Hz, H-7''), 6.32 (1H, d, *J* = 16.0 Hz, H-8'').

¹³C NMR (CD₃OD-*d*₄, 125 MHz) δ: 98.3 (C-1), 153.6 (C-3), 112.5 (C-4), 36.6 (C-5), 40.0 (C-6), 131.2 (C-7), 139.7 (C-8), 47.2 (C-9), 63.8 (C-10), 170.5 (C-11), 99.9 (glu-C-1'), 74.7 (glu-C-2'), 77.8 (glu-C-3'), 71.6 (glu-C-4'), 78.3 (glu-C-5'), 62.8 (glu-C-6'), 127.1 (C-1''), 131.2 (C-2''), 116.8 (C-3''), 161.1 (C-4''), 116.8 (C-5''), 131.2 (C-6''), 146.6 (C-7''), 115.0 (C-8''), 169.0 (C-9'').

1.2. ampicoside (6)

White amorphous powder, ESI-MS: m/z 535.2 [M + Na]⁺, 1047.2 [2M + Na]⁺ and 1023.2 [2M – H][–].

¹H NMR (CD₃OD-*d*₄, 500 MHz) δ: 5.21 (1H, d, *J* = 9.5 Hz, H-1), 6.40 (1H, d, *J* = 6.0 Hz, H-3), 5.02 (1H, dd, *J* = 6.0, 4.5 Hz, H-4), 5.15 (1H, d, *J* = 7.0 Hz, H-6), 3.78 (1H, s, H-7), 3.88 (1H, d, *J* = 13.0 Hz, H-10a), 4.21 (1H, d, *J* = 13.0 Hz, H-10b), 4.83 (1H, d, *J* = 8.0 Hz, glc-H-1'), 7.58 (1H, d, *J* = 2.0 Hz, H-2''), 6.88 (1H, d, *J* = 8.5 Hz, H-5''), 7.61 (1H, dd, *J* = 8.5 and 2.0 Hz, H-6''), 3.92 (3H, s, OCH₃).

¹³C NMR (CD₃OD-*d*₄, 125 MHz) δ: 93.7 (C-1), 141.0 (C-3), 101.6 (C-4), 35.4 (C-5), 80.3 (C-6), 58.9 (C-7), 65.5 (C-8), 41.8 (C-9), 59.9 (C-10), 98.3 (glc-C-1'), 73.5 (glc-C-2'), 77.2 (glc-C-3'), 70.4 (glc-C-4'), 76.3 (glc-C-5'), 61.5 (glc-C-6'), 120.6 (C-1''), 112.2 (C-2''), 151.7 (C-3''), 147.4 (C-4''), 114.6 (C-5''), 123.9 (C-6''), 166.5 (C=O), 55.1 (OCH₃).

1.3. 6-*O*-*trans*-feruloylcatalpol (7)

White amorphous powder, ESI-MS: *m/z* 561.2 [M + Na]⁺, 1099.1 [2M + Na]⁺ and 1075.3 [2M – H][–].

¹H NMR (CD₃OD-*d*₄, 500 MHz) δ: 5.17 (1H, d, *J* = 9.5 Hz, H-1), 6.38 (1H, d, *J* = 6.0 Hz, H-3), 5.07 (1H, d, *J* = 6.0 Hz, H-4), 5.00 (1H, dd, *J* = 5.5 and 5.0 Hz, H-6), 3.73 (1H, s, H-7), 3.86 (1H, d, *J* = 13.0 Hz, H-10a), 4.20 (1H, d, *J* = 13.0 Hz, H-10b), 4.84 (1H, d, *J* = 7.5 Hz, glc-H-1'), 7.20 (1H, s, H-2''), 7.09 (1H, dd, *J* = 8.5 and 1.5 Hz, H-5''), 6.83 (1H, d, *J* = 8.5 Hz, H-6''), 7.66 (1H, d, *J* = 16.0 Hz, H-7''), 6.41 (1H, d, *J* = 16.0 Hz, H-8''), 3.90 (3H, s, OCH₃).

¹³C NMR (CD₃OD-*d*₄, 125 MHz) δ: 93.8 (C-1), 141.0 (C-3), 101.6 (C-4), 35.4 (C-5), 79.9 (C-6), 58.9 (C-7), 65.5 (C-8), 41.8 (C-9), 59.9 (C-10), 98.3 (glc-C-1'), 73.4 (glc-C-2'), 77.2 (glc-C-3'), 70.3 (glc-C-4'), 76.3 (glc-C-5'), 61.5 (glc-C-6'), 126.2 (C-1''), 110.4 (C-2''), 147.9 (C-3''), 149.3 (C-4''), 115.1 (C-5''), 123.0 (C-6''), 146.1 (C-7''), 113.5 (C-8''), 167.6 (C-9''), 55.1 (OCH₃).

1.4. Agnucastoside C (8)

White amorphous powder, ESI-MS: *m/z* 707.3 [M + Na]⁺ and 683.6 [M – H][–].

¹H NMR (CD₃OD-*d*₄, 500 MHz) δ: 5.35 (1H, d, *J* = 5.6 Hz, H-1), 7.44 (1H, s, H-3), 3.07 (1H, q, *J* = 8.0 Hz, H-5), 1.09 (3H, d, *J* = 7.2 Hz, H-10), 4.75 (1H, d, *J* = 7.6 Hz, glc-H-1'), 4.42 (1H, dd, *J* = 12.0 and 6.0 Hz, glc-H-6'a), 4.55 (1H, dd, *J* = 12.0 and 2.0 Hz, glc-H-6'a), 7.06 (1H, d, *J* = 1.6 Hz, H-2''), 6.74 (1H, d, *J* = 8.0 Hz, H-5''), 6.93 (1H, dd, *J* = 8.0 and 1.6 Hz, H-6''), 7.59 (1H, d, *J* = 15.6 Hz, H-7''), 6.31 (1H, d,

1 $J = 15.6$ Hz, H-8"), 7.45 (2H, d, $J = 8.0$ Hz, H-2"',6"), 6.80 (2H, d, $J = 8.8$ Hz, H-
2 3"',5"), 7.59 (1H, d, $J = 15.6$ Hz, H-7"), 6.31 (1H, d, $J = 15.6$ Hz, H-8").

3 ^{13}C NMR ($\text{CD}_3\text{OD}-d_4$, 125 MHz) δ : 96.1 (C-1), 152.7 (C-3), 115.7 (C-4), 32.6
4 (C-5), 39.5 (C-6), 82.3 (C-7), 43.1 (C-8), 43.4 (C-9), 14.4 (C-10), 170.7 (C-11), 99.9
5 (glc-C-1'), 74.8 (glc-C-2'), 77.8 (glc-C-3'), 71.7 (glc-C-4'), 75.7 (glc-C-5'), 64.0 (glc-
6 C-6'), 127.7 (C-1"), 114.8 (C-2"), 149.6 (C-3"), 147.4 (C-4"), 116.4 (C-5"), 123.3 (C-
7 6"), 146.5 (C-7"), 115.4 (C-8"), 169.0 (C-9"), 127.2 (C-1""), 131.2 (C-2""), 116.8 (C-
8 3""), 161.2 (C-4""), 116.8 (C-5""), 131.2 (C-6""), 146.7 (C-7""), 115.1 (C-8""), 169.0 (C-
9 9").

10 **1.5. *ajugol* (9)**

11 White amorphous powder. ESI-MS: m/z 371.1 $[\text{M} + \text{Na}]^+$, 383.3 $[\text{M} + \text{Cl}]^-$.

12 ^1H NMR (Pyridine- d_5 , 500 MHz) δ : 5.41 (1H, d, $J = 8.0$ Hz, H-1), 6.42 (1H, dd, J
13 = 6.5, 2.0 Hz, H-3), 4.96 (1H, dd, $J = 6.5, 2.5$ Hz, H-4), 3.28 (1H, d, $J = 9.5$ Hz, H-9),
14 1.62 (3H, s, H-10), 4.28 (1H, d, $J = 8.5$ Hz, glc-H-1'), 4.39 (1H, dd, $J = 12.0$ and 5.0
15 Hz, glc-H-6'a), 4.48 (1H, dd, $J = 12.0$ and 2.5 Hz, glc-H-6'b).

16 ^{13}C NMR (Pyridine- d_5 , 125 MHz) δ : 93.7 (C-1), 140.1 (C-3), 105.7 (C-4), 41.6
17 (C-5), 78.7 (C-6), 49.9 (C-7), 78.8 (C-8), 52.2 (C-9), 25.4 (C-10), 100.0 (glc-C-1'),
18 74.9 (glc-C-2'), 77.1 (glc-C-3'), 71.4 (glc-C-4'), 78.5 (glc-C-5'), 62.4 (glc-C-6').

19 **1.6. 6-O-vanilloylajugol (10)**

20 White amorphous powder, ESI-MS: m/z 521.3 $[\text{M} + \text{Na}]^+$, 995.5 $[2\text{M} - \text{H}]^-$ and
21 1031.3 $[2\text{M} + \text{Cl}]^-$.

22 ^1H NMR ($\text{CD}_3\text{OD}-d_4$, 500 MHz) δ : 5.53 (1H, d, $J = 2.4$ Hz, H-1), 6.24 (1H, dd, J
23 = 6.4, 2.4 Hz, H-3), 5.01 (1H, dd, $J = 6.4$ and 2.4 Hz, H-4), 2.07 (1H, dd, $J = 14.0$ and
24 3.6 Hz, H-7a), 2.27 (1H, dd, $J = 14.0$ and 6.0 Hz, H-7b), 2.63 (1H, dd, $J = 9.2$ and 2.0
25 Hz, H-9), 1.41 (3H, s, H-10), 4.69 (1H, d, $J = 7.6$ Hz, glc-H-1'), 3.68 (1H, dd, $J = 12.0$
26 and 5.6 Hz, glc-H-6'a), 3.92 (1H, d, $J = 1.2$ Hz, glc-H-6'b), 7.55 (1H, d, $J = 2.0$ Hz, H-
27 2"), 6.84 (1H, d, $J = 8.4$ Hz, H-5"), 7.57 (1H, dd, $J = 8.4$ and 2.0 Hz, H-6"), 3.89 (3H,
28 s, OCH_3).

29 ^{13}C NMR ($\text{CD}_3\text{OD}-d_4$, 125 MHz) δ : 93.3 (C-1), 141.0 (C-3), 104.5 (C-4), 39.3
30 (C-5), 80.6 (C-6), 47.7 (C-7), 79.1 (C-8), 51.5 (C-9), 26.2 (C-10), 99.2 (glc-C-1'),
31 74.6 (glc-C-2'), 77.8 (glc-C-3'), 71.5 (glc-C-4'), 78.1 (glc-C-5'), 62.7 (glc-C-6'), 122.7

1 (C-1"), 113.5 (C-2"), 152.7 (C-3"), 148.6 (C-4"), 115.8 (C-5"), 125.1 (C-6"), 167.9
2 (C=O), 56.4 (OCH₃).

3 **1.7. 6-O-syringoyl-ajugol (11)**

4 White amorphous powder, ESI-MS: m/z 551.5 [M + Na]⁺, 1079.5 [2M + Na]⁺,
5 1055.5 [2M – H][–] and 1091.5 [2M + Cl][–].

6 ¹H NMR (CD₃OD-*d*₄, 500 MHz) δ : 5.53 (1H, d, J = 2.4 Hz, H-1), 6.25 (1H, dd, J
7 = 6.4 and 2.4 Hz, H-3), 5.01 (1H, dd, J = 6.4 and 2.8 Hz, H-4), 5.06 (1H, m, H-6),
8 2.07 (1H, dd, J = 14.4 and 3.6 Hz, H-7a), 2.29 (1H, dd, J = 14.4 and 6.4 Hz, H-7b),
9 2.63 (1H, dd, J = 9.2 and 2.0 Hz, H-9), 1.43 (3H, s, H-10), 4.68 (1H, d, J = 7.6 Hz,
10 glc-H-1'), 3.67 (1H, dd, J = 12.0 and 6.0 Hz, glc-H-6'a), 3.92 (1H, d, J = 1.6 Hz, glc-
11 H-6'b), 7.36 (1H, s, H-2"), 3.90 (6H, s, OCH₃).

12 ¹³C NMR (CD₃OD-*d*₄, 125 MHz) δ : 93.4 (C-1), 141.2 (C-3), 104.5 (C-4), 39.6
13 (C-5), 80.8 (C-6), 47.7 (C-7), 79.2 (C-8), 51.8 (C-9), 26.2 (C-10), 99.3 (glc-C-1'),
14 74.8 (glc-C-2'), 78.0 (glc-C-3'), 71.7 (glc-C-4'), 78.2 (glc-C-5'), 62.8 (glc-C-6'), 121.7
15 (C-1"), 108.2 (C-2"), 148.9 (C-3"), 141.9 (C-4"), 148.9 (C-5"), 108.2 (C-6"), 167.9
16 (C=O), 56.8 (OCH₃).

17 **1.8. linearoside (12)**

18 White amorphous powder, ESI-MS: m/z 545.1 [M + Na]⁺, 1067.0 [2M + Na]⁺,
19 521.8 [M – H][–] and 1043.2 [2M – H][–].

20 ¹H NMR (CD₃OD-*d*₄, 500 MHz) δ : 5.54 (1H, d, J = 4.0 Hz, H-1), 7.40 (1H, s, H-
21 3), 1.13 (3H, d, J = 7.0 Hz, H-10), 4.73 (1H, d, J = 8.0 Hz, glu-H-1'), 3.93 (1H, d, J =
22 11.5 Hz, glu-H-6'a), 3.70 (1H, m, glu-H-6'b), 7.47 (2H, d, J = 8.5 Hz, H-2",6"), 6.83
23 (2H, d, J = 8.0 Hz, H-3",5"), 7.61 (1H, d, J = 16.0 Hz, H-7"), 6.32 (1H, d, J = 16.0 Hz,
24 H-8").

25 ¹³C NMR (CD₃OD-*d*₄, 125 MHz) δ : 95.8 (C-1), 151.5 (C-3), 115.4 (C-4), 31.8
26 (C-5), 39.1 (C-6), 82.7 (C-7), 43.1 (C-8), 43.2 (C-9), 14.4 (C-10), 171.9 (C-11), 99.7
27 (glu-C-1'), 74.7 (glu-C-2'), 77.9 (glu-C-3'), 71.6 (glu-C-4'), 78.3 (glu-C-5'), 62.9 (glu-
28 C-6'), 127.1 (C-1"), 131.2 (C-2"), 116.9 (C-3"), 161.2 (C-4"), 116.9 (C-5"), 131.2 (C-
29 6"), 146.5 (C-7"), 115.9 (C-8"), 169.1 (C-9").

30 **1.9. nudifloside (13)**

1 White amorphous powder, ESI-MS: m/z 547.1 $[M + Na]^+$, 523.2 $[M - H]^-$ and
2 559.2 $[M + Cl]^-$.

3 1H NMR (CD_3OD-d_4 , 500 MHz) δ : 5.17 (1H, d, $J = 9.5$ Hz, H-1), 6.38 (1H, d, $J =$
4 6.0 Hz, H-3), 5.07 (1H, d, $J = 6.0$ Hz, H-4), 5.00 (1H, dd, $J = 5.5, 5.0$ Hz, H-6), 3.73
5 (1H, s, H-7), 3.86 (1H, d, $J = 13.0$ Hz, H-10a), 4.20 (1H, d, $J = 13.0$ Hz, H-10b), 4.84
6 (1H, d, $J = 7.5$ Hz, glc-H-1'), 7.20 (1H, s, H-2''), 7.09 (1H, dd, $J = 8.5$ and 1.5 Hz, H-
7 5''), 6.83 (1H, d, $J = 8.5$ Hz, H-6''), 7.66 (1H, d, $J = 16.0$ Hz, H-7''), 6.41 (1H, d, $J =$
8 16.0 Hz, H-8''), 3.90 (3H, s, OCH_3).

9 ^{13}C NMR (CD_3OD-d_4 , 125 MHz) δ : 93.8 (C-1), 141.0 (C-3), 101.6 (C-4), 35.4
10 (C-5), 79.9 (C-6), 58.9 (C-7), 65.5 (C-8), 41.8 (C-9), 59.9 (C-10), 98.3 (glc-C-1'),
11 73.4 (glc-C-2'), 77.2 (glc-C-3'), 70.3 (glc-C-4'), 76.3 (glc-C-5'), 61.5 (glc-C-6'), 126.2
12 (C-1''), 110.4 (C-2''), 147.9 (C-3''), 149.3 (C-4''), 115.1 (C-5''), 123.0 (C-6''), 146.1
13 (C-7''), 113.5 (C-8''), 167.6 (C-9''), 55.1 (OCH_3).

14 **1.10. catalpol (14)**

15 White amorphous powder. ESI-MS: m/z 385.1 $[M + Na]^+$ and 397.4 $[M + Cl]^-$.

16 1H NMR (CD_3OD-d_4 , 500 MHz) δ : 5.05 (1H, d, $J = 10.0$ Hz, H-1), 6.37 (1H, dd,
17 $J = 6.0, 1.5$ Hz, H-3), 5.09 (1H, t, $J = 5.5$ Hz, H-4), 2.56 (1H, dd, $J = 9.5$ and 8.0 Hz,
18 H-9), 3.81 (1H, d, $J = 13.0$ Hz, H-10a), 4.16 (1H, d, $J = 13.0$ Hz, H-10b), 4.80 (1H, d,
19 $J = 8.0$ Hz, glc-H-1').

20 ^{13}C NMR (CD_3OD-d_4 , 125 MHz) δ : 93.9 (C-1), 140.4 (C-3), 102.7 (C-4), 37.7
21 (C-5), 78.1 (C-6), 61.2 (C-7), 64.9 (C-8), 42.2 (C-9), 60.2 (C-10), 98.3 (glc-C-1'),
22 73.4 (glc-C-2'), 77.1 (glc-C-3'), 70.3 (glc-C-4'), 76.2 (glc-C-5'), 61.5 (glc-C-6').

23

1 **Figure**

2

3

Figure S1. Chemical structure of known compounds **5-14**.

Figure S2. ¹H NMR spectrum of compound **1**

Figure S3. ¹³C NMR spectrum of compound **1**

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2

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Figure S4. DEPT spectrum of compound 1

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Figure S5. COSY spectrum of compound 1

Figure S6. HSQC spectrum of compound **1**

Figure S7. HMBC spectrum of compound **1**

Figure S8. NOESY spectrum of compound 1

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Figure S9. ESI-MS spectrum of compound **1**

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Figure S10. HR-ESI-MS spectrum of compound 1

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Figure S11. ¹H NMR spectrum of compound 2

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Figure S12. ^{13}C NMR spectrum of compound **2**

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Figure S13. COSY spectrum of compound **2**

Figure S14. HSQC spectrum of compound 2

Figure S15. HMBC spectrum of compound 2

Figure S16. NOESY spectrum of compound **2**

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2

3

Figure S17. ESI-MS spectrum of compound 2

1

2

Figure S18. HR-ESI-MS spectrum of compound **2**

3

4

Figure S19. ¹H NMR spectrum of compound **3**

2 **Figure S20.** ^{13}C NMR spectrum of compound **3**

4 **Figure S21.** DEPT spectrum of compound **3**

2

Figure S22. COSY spectrum of compound 3

4

Figure S23. HSQC spectrum of compound 3

Figure S24. HMBC spectrum of compound 3

Figure S25. NOESY spectrum of compound 3

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3

Figure S26. ESI-MS spectrum of compound 3

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Figure S27. HR-ESI-MS spectrum of compound 3

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4

Figure S28. ¹H NMR spectrum of compound 4

Figure S29. ^{13}C NMR spectrum of compound **4**

Figure S30. DEPT spectrum of compound **4**

Figure S31. COSY spectrum of compound 4

Figure S32. HSQC spectrum of compound 4

Figure S33. HMBC spectrum of compound **4**

Figure S34. NOESY spectrum of compound **4**

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Figure S35. ESI-MS spectrum of compound 4

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Figure S36. HR-ESI-MS spectrum of compound **4**