N-CONTAINING COMPOUNDS FROM THE TRADITIONAL CHINESE MEDICINE CHANSU

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The traditional Chinese medicine ChanSu, also called toad venom or toad poison, is a product of the skin secretions of local giant toads, including *Bufo bufo gargarizans* Cantor and *B. melanostictus* Schneider., which has been used traditionally as a cardiotonic, diuretic, anodyne, and hemostatic agent [1, 2]. Thin-plate ChanSu was purchased from Nantong Jianqiao Pharmaceuticals Company in Jiangsu Province, China, in November 2004, and authenticated by Professor Han-Ming Zhang of the Department of Pharmacognosy of this college. It appears as a dark brown rectangular thin plate (23 cm × 10 cm × 0.1 cm). A voucher specimen (20041125) has been deposited at the Herbarium of the School of Pharmacy, Second Military Medical University, Shanghai, P. R. China.

The dried and powdered ChanSu (7.5 kg) was extracted with 90% ethanol at room temperature. After evaporation of EtOH, the remaining liquor was partitioned successively with $CHCl_3$, EtOAc, and *n*-BuOH. A part of the EtOAc extract (100 g) was subjected to column chromatography on silica gel with gradient elution by $CHCl_3$–MeOH (10:1–1:1) and purified by column chromatography on Sephadex LH-20, eluting with MeOH to afford **1**–**7**. All those compounds were isolated from ChanSu for the first time.

The compounds were identified on the basis of UV, IR, mass, and NMR spectrum, and all these data were in good agreement with the literature data [3–5]. The NMR data of compounds **4** and **5** are reported for the first time in this paper.

Nicotinamide (1). $C_6H_6N_2O$, ESI-MS *m/z*: 123 $[M+H]^+$, mp 145–147°C. ^1H NMR (500MHz, DMSO-d_6, δ, ppm, J/Hz): 7.50 (1H, dd, J = 8.0, 5.0, H-5), 7.58 and 8.18 (1H respectively, br.s, -$CONH_2$), 8.23 (1H, dt, J = 8.0, 2.0, H-4), 8.70 (1H, dd, J = 5.0, 2.0, H-6), 9.04 (1H, d, J = 2.0, H-2). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 123.4 (C-5), 129.7 (C-3), 135.2 (C-4), 148.5 (C-6), 151.6 (C-27), 166.3 (C-7) [3].

Bufobutanoic Acid Methyl Ester (2), (Methyl *N*-[2-(5-hydroxyindol-3-yl)] succinate). $C_{15}H_{18}N_2O_4$, ESI-MS *m/z*: 291 $[M+H]^+$, UV (MeOH, λ_{max}, nm): 225, 273, 300. ^1H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.37 (2H, t, J = 7.0, H_2-15), 2.51 (2H, t, J = 7.0, H_2-14), 2.71 (2H, t, J = 7.2, H_2-10), 3.27 (2H, q, J = 7.2, H_2-11), 3.58 (3H, s, OCH_3), 6.59 (1H, dd, J = 8.6, 2.5, H-6), 6.83 (1H, d, J = 2.5, H-4), 7.02 (1H, d, J = 2.0, H-2), 7.12 (1H, d, J = 8.6, H-7), 8.00 (1H, t, J = 6.0, H-12), 8.60 (1H, s, 5-OH), 10.50 (1H, br.s, H-1). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 25.3 (C-10), 28.8 (C-14), 29.9 (C-15), 39.4 (C-11), 51.2 (OCH_3), 102.2 (C-4), 110.8 (C-3), 111.2 (C-6), 111.5 (C-7), 123.0 (C-2), 127.8 (C-9), 130.8 (C-8), 150.1 (C-5), 170.4 (C-13), 172.8 (C-16) [4].

Methyl-2-oxopipecolate (3). $C_7H_{11}NO_3$, ESI-MS *m/z*: 158 $[M+H]^+$, IR (KBr, ν, cm^{-1}): 3500, 1750, 1660. ^1H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.61 and 1.67 (1H respectively, m, H_2-4), 1.79 and 1.94 (1H respectively, m, H_2-5), 2.14 and 2.16 (1H respectively, m, H_2-3), 3.67 (3H, s, OCH_3), 4.07 (1H, td, J = 5.2, 3.0, H-6), 7.50 (1H, br.s, H-1), 8.60 (1H, s, 5-OH), 10.50 (1H, br.s, H-1). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 18.4 (C-4), 24.9 (C-5), 30.9 (C-3), 52.0 (OCH_3), 53.7 (C-6), 169.9 (C-7), 172.7 (C-2) [5].

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6-Hydroxy-1-oxo-3,4-dihydro-β-carboline (4). Colorless powder. $C_{11}H_{10}N_2O_2$, ESI-MS *m/z*: 203 $[M+H]^+$, UV (λ_{max}, MeOH, nm): 225, 274, 300. ^{1}H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.82 (2H, t, J = 6.8, H_2-4), 3.47 (2H, td, J = 6.8, 2.4, H_2-3), 6.75 (1H, dd, J = 8.7, 2.4, H-7), 6.83 (1H, d, J = 2.4, H-5), 7.19 (1H, d, J = 8.7, H-8), 7.43 (1H, br.s, HN-2), 8.83 (1H, br.s, 6-OH), 11.22 (1H, s, HN-9). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 20.3 (C-4), 41.1 (C-3), 102.9 (C-5), 112.9 (C-7), 115.0 (C-7), 117.0 (C-4a), 125.4 (C-4b), 127.5 (C-9a), 131.7 (C-8a), 164.9 (C-1).

***N*-(5-Acetyl-1H-pyrrol-3-yl)-acetamide (5).** White powder. $C_8H_{10}N_2O_2$, ESI-MS *m/z*: 167 $[M+H]^+$, mp 112–114°C, UV (λ_{max}, MeOH, nm): 236, 309. ^{1}H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.96 (3H, s, **C**$\underline{\mathbf{H}}_3$CONH), 2.31 (3H, s, $COCH_3$), 6.79 (1H, dd, J = 2.5; 1.5, H-4), 7.22 (1H, dd, J = 2.8, 1.5, H-2), 9.85 (1H, s, AcNH), 11.48 (1H, br.s, HN-1). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 22.9 (**C**$\underline{\mathbf{H}}_3$CONH-), 25.4 (CO**C**$\underline{\mathbf{H}}_3$), 106.9 (C-4), 115.2 (C-2), 124.9 (C-3), 129.0 (C-5), 166.9 (CH_3**CO**NH), 186.9 (**CO**CH_3).

Adenine (6). White powder. $C_5H_5N_5$, ESI-MS *m/z*: 136 $[M+H]^+$, mp 102–104°C, IR (KBr, ν, cm^{-1}): 3310, 3135, 2980, 2805, 2723, 2601, 1370, 1156, 1030, 870. ^{1}H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 7.10 (2H, s, 6-NH_2), 8.10 (1H, s, H-8), 8.11 (1H, s, H-2), 12.78 (1H, br.s, HN-9). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm):121.9 (C-5), 139.5 (C-8), 151.6 (C-4), 152.2 (C-2), 155.6 (C-6) [3].

Uracil (7). White powder, $C_4H_4N_2O_2$, ESI-MS *m/z*: 113 $[M+H]^+$, mp 123–125°C. ^{1}H NMR (500 MHz, DMSO-d_6, δ, ppm, J/Hz): 5.45 (1H, d, J = 7.0, H-6), 7.39 (1H, d, J = 7.0, H-5), 10.93 (2H, br.s, HN-1,3). ^{13}C NMR (125 MHz, DMSO-d_6, δ, ppm): 100.1 (C-5), 142.1 (C-6), 151.4 (C-2), 164.3 (C-4) [3].

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