Asian Journal of Chemistry; Vol. 24, No. 10 (2012), 4829-4830

ASIAN JOURNAL OF CHEMISTRY

www.asianjournalofchemistry.co.in

NOTE

Chemical Constituents of *Canarium album*

ZHAO BAO XIANG[1,*], GUANG HUI JING[1], ZHONG TANG QU[2], XING GAO[1] and LIN SEN HENG[1]

[1]College of Bio-Information, Chongqing University of Posts and Telecommunications, Chongqing 400065, P.R. China
[2]Department of Pharmacy, Chongqing Medical and Pharmaceutical College, Chongqing 400030, P.R. China

*Corresponding author: E-mail: xiangzb@126.com

(*Received*: 20 January 2012; *Accepted*: 15 May 2012) AJC-11507

The *n*-butanol fraction of the dried fruits of *Canarium album* was isolated and purified by means of chromatography. Four compounds were obtained and their structures were identified by spectral analysis as quercetin -3-O-α-L-rhamnoside (**1**), rutin (**2**), quercetin-3-O-β-D-glucoside (**3**) and 2α, 3α, 19α, 24-tetrahydroxyurs-12-en-28-oic acid -28-O-β-D-glucoside (**4**). Compounds **1**, **2** and **4** have not been reported before from the fruit of *Canarium album*, compound **4** is the first triterpenoid saponin isolated from this plant source.

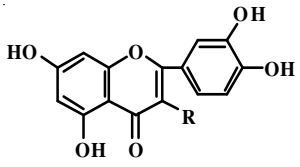
Key Words: Chemical constituents, *Canarium album*, Structures elucidation, *n*-Butanol fraction.

Canarium album (Lour.) Raeusch, normally called Ganlan, Qing Guo in China, is a fruit tree belonging to the burseraceae family, which is widely distributed in southern China. It's fruits have been used as both food and folk medicine in China. It possesses some pharmacological functions, such as antibacterium[1], antiinflammation and detoxification[2], antioxidation[3], antialcohol, hepatoprotective activities[4] and antihepatitis B activities[5]. As for the chemical constituents of the plant, the occurrence of phenolic compounds[6-8], triterpenoids[9,10] and flavonoids[11]. In the course of further studies, four compounds was obtained from the *n*-butanol fraction of the dried fruit of *Canarium album* and identified as quercetin -3-O-α-L-rhamnoside (**1**), rutin (**2**), quercetin-3-O-β-D-glucoside (**3**) and 2α, 3α, 19α, 24-tetrahydroxyurs-12-en-28-oic acid -28-O-β-D-glucoside (**4**). Compounds **1**, **2** and **4** have not been reported before from the fruit of *Canarium album*, compound **4** is the first triterpenoid saponin isolated from this plant source.

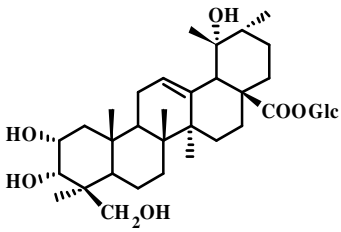
ESI-MS and HRESI-MS were performed with a Mat-212 and a Micro mass Auto Spec Q-TOF spectrometers, respectively. ^{1}H and ^{13}C NMR spectra were recorded on a Bruker DRX-500 spectrometer with tetramethylsilane (TMS) as an internal standard and DMSO-d_6 as solvents. Chemical shifts were given in δ (ppm) values.

The plant material was collected in September 2009 from Jiangjin, Chongqing municipality and identified as the dried fruits of *Canarium album* (Lour.) Raeusch by Prof. Ren Shaoguang, College of Bioengineering, Chongqing University. A voucher specimen (No. 20090902) has been deposited in the herbarium of College of Bio-information, Chongqing University of Posts and Telecommunications, Chongqing.

Extraction and isolation: The dried fruits of *C. album* (7 kg) were chopped and extracted with 80 % EtOH three times under reflux and concentrated under vacuum to yield an EtOH extract (400 g). The extract was suspended in water and extracted successively with petroleum ether, ethyl acetate and *n*-butanol to obtain petroleum ether residue (35 g), ethyl acetate residue (230 g) and *n*-butanol residue (50 g). The *n*-butanol fraction (40 g) was chromatographed over a macroporous resin column, eluting successively with water, 30 % EtOH, 60 % EtOH and 90 % EtOH. The 60 % EtOH fraction (13 g) was then subjected to silica gel CC (200-300 mesh) and Sephadex LH-20(MeOH-H_2O) to yield **1** (35 mg), **2** (70 mg), **3** (28 mg) and **4** (45 mg).



1 R=O-Rha
2 R=O-Rha-(1-6)-Glc
3 R=O-Glc,



4

Structures elucidation: Compound **1**, a yellow powder, which gave positive Molish reaction. ESI-MS m/z: 471 $[M+Na]^+$, 449 $[M+H]^+$, 447$[M-H]^-$, indicating molecular

weight (m.w.) of 1 was 448. ^{1}H NMR (500 MHz, DMSO-d_6) δ : 6.19 (d, *J* = 2.0 Hz, H-6), 6.41 (d, *J* = 2.0 Hz, H-8), 7.68 (d, *J* = 2.0 Hz, H-2'), 6.88 (d, *J* = 8.5 Hz, H-5'), 7.54 (dd, *J* = 8.5, 2.0 Hz, H-6'), 5.24 (d, *J* = 2.0 Hz, H-1''), 0.81 (d, *J* = 6.0 Hz, H-6''). ^{13}C NMR (125 MHz,DMSO-d_6) (Table-1). And comparison with reference[12], compound **1** was identified as quercetin-3-O-α-L-rhamnoside.

TABLE-1
DATA OF COMPOUNDS **1-4**, ^{13}C-NMR
(125 MHz, DMSO-d_6) (δ/ppm)

No.	**1**	**2**	**3**	No.	**4**	No.	**4**
2	157.2	156.6	156.2	1	42.2	21	25.3
3	134.2	133.3	133.4	2	65.5	22	36.1
4	177.7	177.4	177.5	3	73.3	23	22.5
5	161.3	161.2	161.3	4	44.6	24	63.8
6	101.8	98.7	98.8	5	57.8	25	13.7
7	164.0	164.1	164.4	6	18.2	26	16.2
8	93.6	93.6	93.6	7	32.6	27	23.9
9	156.4	156.4	156.4	8	39.2	28	175.6
10	103.9	104.0	104.0	9	46.3	29	25.8
1'	121.1	121.2	121.2	10	37.0	30	16.4
2'	115.6	115.2	115.3	11	23.1	1'	94.1
3'	145.2	144.8	144.9	12	127.0	2'	72.4
4'	148.5	148.4	148.5	13	137.2	3'	77.6
5'	115.4	116.3	116.2	14	40.8	4'	69.5
6'	120.7	121.6	121.7	15	27.5	5'	77.7
1''	98.7	101.2	101.0	16	24.8	6'	60.6
2''	70.3	74.1	74.2	17	47.3		
3''	70.5	76.5	76.6	18	53.2		
4''	71.2	70.0	70.0	19	71.5		
5''	70.0	75.9	77.6	20	40.7		
6''	17.5	67.0	61.0				
1'''		100.7					
2'''		70.4					
3'''		70.6					
4'''		71.9					
5'''		68.2					
6'''		17.7					

Compound **2**, a lemon yellow powder which gave positive Molish reaction, ESI-MS m/z: 633 $[M+Na]^+$, 611 $[M+H]^+$, 609 $[M-H]^-$, indicating molecular weight (m.w.) of **2** was 610. ^{1}H NMR (500 MHz, DMSO-d_6) δ : 6.18 (d, *J* = 2.5 Hz, H-6), 6.39 (d, *J* = 2.5Hz, H-8), 6.83 (d, *J* = 8.0 Hz, H-5'), 7.54 (2H, m, H-6', H-2'), 5.32 (d, *J* = 7.0 Hz, H-1''), 4.38 (S, H-1'''), 0.97 (d, *J* = 6.0 Hz, H-6'''). ^{13}C NMR (125 MHz, DMSO-d_6) (Table-1). And comparison with reference[13], compound **2** was identified as rutin.

Compound **3**, a yellow powder which gave positive Molish reaction. ESI-MS m/z: 487 $[M+Na]^+$, 465 $[M+H]^+$, 463 $[M-H]^-$, indicating molecular weight of compound **3** was 464. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 6.18 (d, *J* = 2.0 Hz, H-6), 6.39 (d, *J* = 2.0 Hz, H-8), 7.56 (d, *J* = 2.0 Hz, H-2'), 6.85 (d, *J* = 8.5 Hz, H-5'), 6.54 (dd, *J* = 8.5, 2.0 Hz, H-6'), 5.43 (d, *J* = 2.0 Hz, H-1''), 4.02 (dd, *J* = 7.0, 6.0 Hz, H-2''), 3.70 (d, *J* = 8.5 Hz, H-6''), 3.50 (d, *J* = 8.5 Hz, H-6''). ^{13}C NMR (125 MHz, DMSO-d_6) (Table-1). And comparison with reference[14], compound **3** was identified as quercetin -3-O-β-D-glucoside.

Compound **4**, a micro-needle crystal from MeOH-chloroform, which gave positive Libermann-Buchard reaction. ESI-MS m/z :689 $[M+Na]^+$, 667 $[M+H]^+$, 665 $[M-H]^-$, indicating molecular weight of compound **4** was 666. The molecular formula $C_{36}H_{58}O_{11}$ was determined by HRESI-MS (m/z 666.3980, calcd. 666.3979 for $C_{36}H_{58}O_{11}$). ^{1}H NMR(500 MHz, DMSO-d_6) δ: 4.11 (d, *J* = 10.0 Hz, H-24), 3.82 (d, *J* = 10.0 Hz, H-24), 1.06 (d, *J* = 6.0 Hz, H-30), 6.27 (d, *J* = 8.5 Hz, H-1'), 4.22 (dd, *J* = 8.0, 6.0 Hz, H-2'). ^{13}C NMR (125 MHz, DMSO-d_6) (Table-1). And comparison with reference[15], compound **4** was identified as 2α, 3α, 19α, 24-tetrahydroxyurs-12-en-28-oic acid-28-O-β-D-glucoside.

ACKNOWLEDGEMENTS

The authors thank Prof. S.G. Ren for the identification of this plant. This work was supported by the Scientific Technology Foundation of Chongqing Educational Commission (KJ102502) and Technology Development Projects of high-tech industry by the National Development and Reform Commission of Chongqing Province (20101389).

REFERENCES

1. J.G. Yuan, X. Liu and Z.Q. Tang, *China J. Food Sci.*, **22**, 82 (2001).
2. B.P. Ding, G.X. Chen, J.R. Yang and W.M. Li, *China Trad. Pat. Med.*, **21**, 27 (1999).
3. L.L. Zhang and Y.M. Lin, *J. Zhejiang Univ. Sci. B*, **9**, 407 (2008).
4. B. Peng, M.S. Miao and Y.F. Wang, *Shanghai J. Trad. Chin. Med.*, **37**, 48 (2003).
5. M.S. Zheng, G.X. Kong, Y.Z. Zhang and W. Li, *Chin. J. Hospital Pharm.*, **8**, 1 (1988).
6. Z.Y. He, W.S. Xia and J. Chen, *Eur. Food Res. Technol.*, **226**, 1191 (2008).
7. Z.Y. He, W.S. Xia, Q.H. Liu and J. Chen, *Eur. Food Res. Technol.*, **228**, 339 (2009).
8. Z.B. Xiang, Y.X. Xu, H.S. Chen, W. Chen and Z.Q. Zhao, *Chin. Trad. Drug*, **31**, 917 (2009).
9. Z.B. Xiang, H.S. Chen, W. Chen, L.X. Xiang and X.H. Li, *Chin. Trad. Drug*, **31**, 1904 (2009).
10. M. Ito, H. Shimura and N. Watanabe, *Chem. Pharm. Bull.*, *(Tokyo)*, **38**, 2201 (1990).
11. Z.B. Xiang, H.S. Chen, Y.S. Jin, G.L. Wang, L.X. Xiang and W. Chen, *Chem. Nat. Comp.*, **46**, 101 (2010).
12. Z.P. Zhang, C. Niu and Y. Sun, *J. Chin. Med. Mater.*, **24**, 725 (2001).
13. X.Y. Cai, P. Li and L.Y. Tang, *Chin. J. Chin. Mater. Med.*, **29**, 865 (2004).
14. Y.P. Tang, Y. Wang and F.C. Lou, *Acta Pharmaceut. Sinica*, **35**, 363 (2000).
15. Y.X. Xu, Z.B. Xiang, Y.S. Jin, Y. Shen and H.S. Chen, *Fitoterapia*, **81**, 920 (2010).