Pergamon

Tetrahedron Letters 40 (1999) 7513–7514

TETRAHEDRON LETTERS

Fissohamione, a Novel Furanone from *Fissistigma oldhamii*

Yi-Chen Chia[1,2], Fang-Rong Chang[2] and Yang-Chang Wu[2]*

[1]Tajen Junior College of Pharmacy, Ping Tung Hsien 900, Taiwan

[2]Graduate Institute of Natural Products, Kaohsiung Medical College, Kaohsiung 807, Taiwan

Received 14 May 1999; accepted 24 August 1999

Abstract: Fissohamione (**1**), a novel (*R*)-4,5-dimethoxy-3-(4′-phenyl-2′-oxobutyl)-5*H*-furan-2-one, has been isolated from *Fissistigma oldhamii*. The structure of **1** was elucidated by spectroscopic methods.

Our laboratory and other investigators have reported a series of studies on *Fissistigma* species.[1-10] *Fissistigma oldhamii* (Memsl.) Merr. (Annonaceae) is a perennial shrub, which is distributed mainly in southern China and Taiwan. This plant has been used as a folklore medicine for liver protection, anti-inflammatory and anti-arthritic effects, and anti-tumor action.[8] As part of our continuing investigation on the phytochemical and bioactive principles of Formosan Annonaceous plants, we have isolated fissohamione (**1**), a novel 3,4,5-substituted furan-2-one, from the methanolic extract of the seeds of *F. oldhamii*.

Specimens of *F. oldhamii* were collected from Taichung, Taiwan in August 1989. The methanolic extract was separated by column chromatography using 1:2 EtOAc/Hexane as an eluent to obtain a fraction, which was further purified by preparative TLC to yield fissohamione (**1**, 0.003% dry wt.).

Fissohamione (**1**) was obtained as a pale-yellow oil, $[\alpha]_D$= +4.6 (c 0.25, $CHCl_3$). The molecular formula, $C_{16}H_{18}O_5$, was confirmed by high-resolution mass spectroscopic measurement (*m/z* 290.1157 $[M]^+$, calcd. 290.1154). The presence of an α,β-unsaturated lactone and ketone moieties were substantiated by its UV (λ_{max} at 210 and 235 nm) and IR (ν_{max} at 1765, 1721 and 1681 cm^{-1}) spectra. The ^1H NMR spectrum of **1** (Table 1) indicated the presence of signals corresponding to one mono-substituted aromatic ring, one proton, two methoxyls, one methylene and two methylene groups. The ^{13}C NMR and DEPT experiments (Table 1) further confirmed the possession of six methines, five quaternary carbons (including a carbonyl at δ 204.91), three methylenes and two methoxyl signals. The above mentioned data indicated the presence of a 4′-phenyl-2′-oxobutyl side chain, which is in agreement with those reported in the literature.[10]

0040-4039/99/$ - see front matter
PII: S0040-4039(99)01597-X

Further confirmation of the structural assignment, two-dimensional NMR experiments were employed. The sequential correlations of NOESY and long range HETCOR were successfully established as shown in Figure 1 and Table 1, respectively. The absolute configuration of **1** was determined by the CD method.[11] According to a negative π–π^* Cotton effect ($\Delta\varepsilon < 0$), it clearly indicated the γ-butenolide fragment has the (*R*)-configuration. The above results support the structure of **1** as a novel (*R*)-4,5-dimethoxy-3-(4′-phenyl-2′-oxobutyl)-5*H*-furan-2-one, which is provisionally named fissohamione.

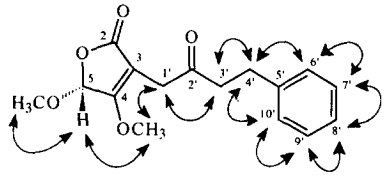

Fig. 1 NOESY experiments of fissohamione (**1**)

Table 1. ^{13}C NMR (100 MHz, $CDCl_3$) and ^1H NMR (400 MHz) data for fissohamione (**1**).

Position	δC	δH, *J* (Hz)	LRHETCOR
2	171.26		
3	98.85		
4	170.30		
5	97.91	5.68, s	C-4
1'	36.35	3.37, ABq (17.6)	C-2', C-2, C-4, C-3
2'	204.91		
3'	43.91	2.84, m	
4'	29.62	2.91, m	
5'	140.60		
6',10'	128.31		
7',9'	128.48	7.16-7.27, m	
8'	126.16		
OMe-4	58.35	3.93, s	C-4
OMe-5	55.28	3.52, s	C-5

Acknowledgement. This investigation was supported by a grant from the National Science Council, R.O.C. awarded to Y. C. Wu.

References and notes.

1. Lu, S. T., Wu, Y. C. *Heterocycles* **1983**, *20*, 813.

2. Lu, S. T., Wu, Y. C. and Leou, S. P. *Phytochemistry* **1985**, *24*, 1829.

3. Wu, Y. C., Lu, S. T., Wu, T. S. and Lee, K. H. *Heterocycles* **1987**, *26*, 9.

4. Wu, Y. C., Kao, S. C., Huang, J. F., Duh, C. Y. and Lu, S. T. *Phytochemistry* **1990**, *29*, 2387.

5. Chia, Y. C., Chang, F. R., Li, C. M. and Wu, Y. C. *Phytochemistry* **1998**, *48*, 367.

6. Chia, Y. C., Chang, F. R. and Wu, Y. C. *J. Nat. Prod.* **1998**, *61*, 1430.

7. Wu, J. B., Cheng, Y. D., Chiu, N. Y., Huang, S. C. and Kuo, S. C. *Planta Med.* **1993**, *59*, 179.

8. Wu, J. B., Cheng, Y. D., Kuo, S. C., Wu, T. S., Iitaka, Y., Ebizuka, Y. and Sankawa, U. *Chem. Pharm. Bull.* **1994**, *42*, 2202.

9. Shang, L. J., Zhao, B. T. and Hao, X. J. *Yunnan Zhiwu Yanjiu* **1994**, *16*, 191.

10. Hao, X. J., Lu, Y., Shang, L. J. and Zheng, Q. T. *Yunnan Zhiwu Yanjiu* **1995**, *5*, 143.

11. Gawronski, J. and Wu, Y. C. *Polish J. Chem.* **1999**, 73, 241.