# A New Lignan Glucoside from *Lancea tibetica*

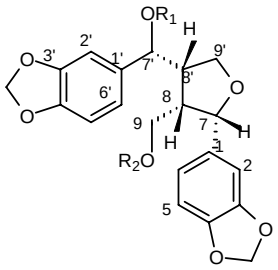
Bao Ning SU, Cheng Shan YUAN and Zhong Jian JIA*

Department of Chemistry, National Laboratory of Applied Organic Chemistry, Lanzhou University, Lanzhou, 730000

**Abstract**: A new 7-9'-monoepoxy tetrahydrofuran type lignan glucoside with the cis-relationship of H-7 and H-8, named tibeticoside A **1**, was isolated from the medicinal whole plants of *Lancea tibetica.* Its structure was elucidated by spectroscopic methods and chemical transformation.

**Keywords:** *Lancea tibetica*; scrophulariaceae; tibeticoside A.

*L. tibetica* Hook. f. et Thoms. is an important Tibetan medicine used for treatment of many diseases[1]. The lignan glycosides and triterpenes from this plant have been reported[2,3] by Huidi Zhang et al. This paper describes the structure elucidation of a new lignan glucoside, named tibeticoside A **1**.




**1** $R_1$=H $R_2$=Glu
**1a** $R_1$=Ac $R_2$=Glu(Ac)$_4$

Compound **1** was obtained as a white amorphous powder, $[\alpha]_D^{20}$ -120 (c 0.50, MeOH), UV $\lambda_{max}^{MeOH}$ (log$\in$): 207 (4.52), 235 (3.34), 286 (3.32) nm. The IR spectrum (KBr) showed absorptions for hydroxyl (3422-3461cm$^{-1}$) and aromatic ring (1635, 1502cm$^{-1}$). The molecular formula of **1** was determined to be $C_{26}H_{30}O_{12}$ on the basis of NMR spectral data and elemental analysis. $^1$HNMR spectrum of **1** showed the presence of aromatic rings at $\delta$ 6.73-6.87, two methylenedioxy groups at $\delta$6.96 (2H, brs) and 6.97 (2H, brs), two methines connected with oxygen at $\delta$ 5.05 (1H, s, H-7) and 4.37 (1H, d, J=9.7Hz, H-7'), the anomeric proton of glucose at $\delta$ 4.24 (1H, d, J=7.6Hz). $^{13}$CNMR and DEPT data (**Table 1**) of **1** showed the presence of four methines and two methylenes except two aromatic rings, two methylenedioxy groups and the signals of a glucose. On acid hydrolysis with HCl, compound **1** afforded glucose (identified by PC). From the above results, **1** seemed to be a 7-9'-monoepoxy tetrahydrofuran type lignan glucoside.

$^{1}$H and $^{13}$CNMR data of **1** were assigned on the basis of the $^{1}$H-$^{1}$HCOSY and HMQC. Furthermore, the correlations of $^{1}$H-$^{1}$H COSY confirmed the structure skeleton given. In the HMBC spectrum of **1**, the correlations of H-7 (δ 5.05) with C-8, C-9, C-9', C-2, C-6 and C-1; H-7' (δ 4.37) with C-8', C-2', C-6' and C-1'; H-1 of Glu. (δ 4.24) with C-9, all of these correlations were in agreement with the structure.

Compound **1** has been acetylated to **1a** by using acetic anhydride and pyridine (1:1). $^{1}$H and $^{13}$CNMR spectra of **1a** showed five acetyls. Furthermore, the chemical shift values of H-7' and H-8' of **1a** appeared significantly downfield when comparison with **1**, suggesting C-7' of **1** to be connected with a hydroxyl. The correlations of δ 4.96 (H-7) with 2.36 (H-8) and δ 2.36 (H-8) with 2.92 (H-8') in the NOESY spectrum of **1a** indicated that H-7, H-8 and H-8' were cis-relationship. Thus, the structure of **1** has been determined.

**Table1.** $^{13}$CNMR data of 1 (DMSO-$d_6$) and 1a ($CDCl_3$) (100MHz, δ, ppm, TMS)

| C | **1** | **1a** | C | **1** | **1a** | C | **1** | **1a** |
|---|---|---|---|---|---|---|---|---|
| 1 | 138.3 | 133.6 | 1' | 139.3 | 136.9 | Glu. 1 | 102.6 | 101.1 |
| 2 | 105.8 | 105.9 | 2' | 106.2 | 106.8 | 2 | 73.5 | 71.9 |
| 3 | 147.1 | 147.8 | 3' | 147.1 | 147.8 | 3 | 76.9 | 74.0 |
| 4 | 145.8 | 146.7 | 4' | 146.2 | 147.5 | 4 | 69.9 | 68.3 |
| 5 | 107.7 | 108.0 | 5' | 107.8 | 108.2 | 5 | 76.6 | 72.7 |
| 6 | 118.0 | 118.6 | 6' | 119.0 | 120.6 | 6 | 61.0 | 61.7 |
| 7 | 82.5 | 83.4 | 7' | 70.2 | 71.2 | $OCH_2O$ | 100.6<br>100.6 | 100.8, 100.9 |
| 8 | 47.4 | 48.9 | 8' | 48.3 | 45.6 | OCOMe | | 169.1, 169.3, 169.5, 170.3, 170.5 |
| 9 | 66.3 | 67.3 | 9' | 69.1 | 70.2 | | | 20.6, 20.6, 20.7, 20.7, 21.1 |

## Acknowledgments

This work was supported by the National Natural Science Foundation of China and the Foundation of the State Education Commission of China for Doctoral Program.

## References

1. Jiangsu New Medical College, *Chinese Medicine Dictionary*, Shanghai People's Publishing House, China, **1977**, 264.
2. H. D. Zhang, M. T. Wang, R. D. Zheng, S. J. Zhang, Y. Z. Cheng *J. Lanzhou University* **1987**, *23*, 156-158.
3. R. D. Zheng, M. T. Wang, H. D. Zhang *Zhongguo Zhiwu Xuebao* **1985**, *27*, 402-406.

Received 30 June 1998