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A New Phytosterone from *Cyanotis arachnoidea*

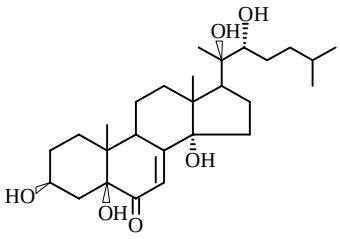
Cheng Yu TAN*, Jin Hui WANG, Wan XIAO, Xian LI

Research Department of Natural Medicinal, Shenyang Pharmaceutical University,
Shenyang, 110015

Abstract: A new phytosterone named cyanosterone B (**1**) has been isolated from *Cyanotis arachnoidea* C. B. Clarke. The structure of cyanosterone B was elucidated as $3\beta,5\beta,14\alpha,20R,22R$-pentahydroxy-cholest-7-en-6-one on the basis of spectroscopic analysis.

Keywords: *Cyanotis arachnoidea*, cyanosterone B

Cyanotis arachnoidea C. B. Clarke is a Chinese herbal medicine. It possesses the function of "recovering weakness, getting rid of humidity, stimulating the circulation of blood, relaxing the muscles and joints[1]". The chemical investigation of this plant has been reported previously[2,3]. Recently, a new phytosterone was isolated from this plant. In this paper, we reported the structural elucidation of the new compound named cyanosterone B (**1**).



1

Cyanosterone B **(1)** gave positive response to Liebermann-Burchard reaction. The molecule formula of $C_{27}H_{44}O_6$ was determined on the basis of ESI-MS together with ^{13}CNMR and ^{1}HNMR spectra. The ^{13}CNMR (see **Table 1**) spectrum showed 27 carbon signals in which the signals at δ 200.7, 165.9 and 120.2 showed characteristic ecdystroid-type skeleton[4]. The HMBC spectrum (see **Figure 1**) showed the correlations between δ 6.18 (br.s, 1H, H-7) with 77.5 (C-5), δ 40.3 (C-9) and 84.0 (C-14), the correlations between δ 77.5 (C-5) and 2.96 (dd, 1H, J = 3.8, 12.0, H_β-4), 2.21 (d, 1H, J = 12.0, H_α-4) were also observed. δ2.96 (1H, dd, J = 3.8, 12.0, H_β-4) and 2.21 (d, 1H, J = 12.0, H_α-4) showed correlation with δ 4.66(m, 1H, H-3) in the ^{1}H-^{1}HCOSY. In the

^{13}C-^{1}HCOSY spectrum, δ 4.66 (m, 1H, H-3) had the correlation with δ 67.0 (C-3). δ 1.59 (s, 3H, H-21) showed the correlations with δ 76.9 (C-20, 22) in the HMBC. These facts indicated five hydroxyl groups were at C-3, -5, -14, -20 and -22 respectively.

Compared with β-ecdysone[4], the chemical shifts of C_{11}-C_{22} had no differences between the two compounds, this fact meant that the relative configuration of hydroxyls were 14 α, 20 *R*, 22 *R*. The configuration of hydroxyls of C-3 and C-5 were established as 3 β, 5 β, on the basis of the NOESY spectrum along with Dreiding stereomodels (see **Figure 2**). Then, the formulation of **1** was elucidated as 3 β, 5 β, 14 α, 20 *R*, 22 *R*- pentahydroxy-cholest-7-en-6-one.

Figure 1 The HMBC correlations of **1**

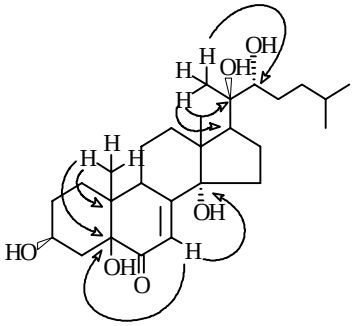


Figure 2 The NOESY enhancement of **1**

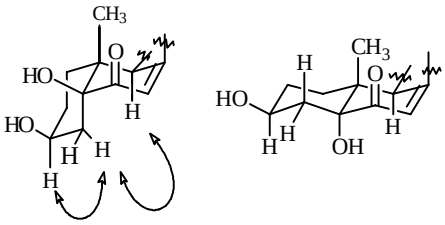


Table 1 ^{13}CNMR spectral data for **1** in Pyridine-d_5

Carbon	δ ppm	Carbon	δ ppm	Carbon	δ ppm
1	31.3	10	41.6	19	16.1
2	31.8	11	21.3	20	76.9
3	67.0	12	32.1	21	21.7
4	37.7	13	48.1	22	76.9
5	77.5	14	84.0	23	30.3
6	200.7	15	31.7	24	37.2
7	120.2	16	21.6	25	28.2
8	165.9	17	50.2	26	23.4
9	40.3	18	18.0	27	22.3

References

1. Jiangsu New Medicinal College, *Dictionary of Chinese herbal medicine*, Shanghai People′s Republishing House, Shanghai, **1997**, *2*, p.2736.
2. R. L. Nie, X. Y. Xu, M. He, *Acta Chimica Sinica*, **1978**, *36* (2), 137.
3. R. L. Nie, M. H. Qiu, *Acta Botanica Yunnanica*, **1987**, *9* (2), 253.
4. D. A. Guo, Z. Q. Lou, C. Y. Gao, *Acta Pharm. Sinica*, **1991**, *26*, 442

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