NOTE

A NOVEL LACTAM FROM *DELPHINIUM CAERULEUM**

PAN Yuan-jiang(潘远江), SUN Cui-rong(孙翠荣), CHEN Yao-zu(陈耀祖)
(*Department of Chemistry, Zhejiang Univesity, Hangzhou, 310027, China*)

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Abstract: The structure of a novel lactam(I) isolated from *Delphinium caeuleum Jacq. ex* Camb was determined by spectral data.

Key words: *delphinium caeuleum*, a novel lactam, spectral elucidation
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Isolation of a series of ditepenoid alkaloids from *Delphinium caeuleum Jacq. ex* Camb was reported in our previous work (Pan et al 1992, 1993, 1996a, b). In the present work, a novel lactam (I) was isolated from the same plant and its structure was determined on the basis of spectral data.

The molecular formula $C_{20}H_{23}NO_4$ for compound (I), an amorphous powder, $[\alpha]_D^{17}$: +31.1 (MeOH, C = 0.3), was established by high resolution mass spectrometry (Calcd: 341.1627, found 341.1666). The IR bands found at 3436, 1670 and 759 cm^{-1} indicated a lactam with a tertiary amide structure (Chen, 1983; Huang, 1958). The IR absorption at 1615, 1571, 1488, 867 and 755 cm^{-1} revealed the presence of aromatic ring.

In ^{1}HNMR spectrum (δ), three singlet signals at 3.80, 3.38 and 3.88 (each 3H, s) suggested three $-OCH_3$ groups on the aromatic ring; the strong resonance absorption at 2.46 (3H, s), corresponded to an N-CH_3 group. In the low field region, the four separated signals at 6.31, 6.36 and 6.82 (each 1H, s) showed four aromatic hydrogen atoms. The ^{13}CNMR data indicated only 20 carbon atoms in the molecule, among them 11 appeared in the low field (> 110 δ see Table 1) which include one carbonyl carbon atom and 10 naphthalene ring atoms. According to these evidences, a partial structure was assigned as A of Figure 1, in which R consisted only of seven carbon atoms (including a N - CH_3 group and a carbonyl group). The element composition ($C_{20}H_{23}NO_4$) of (I) showed that the number of total rings plus unsaturated bonds was 10 units, in which 8 units were contributed by a naphthalene ring and a carbonyl group; and that the remaining 2 units should be due to the two rings present in R of Figure 1. From the deduction mentioned above and DEPT(135° and 90°) spectral data, the structure of (I) was preliminarily elucidated as shown in Fig.1

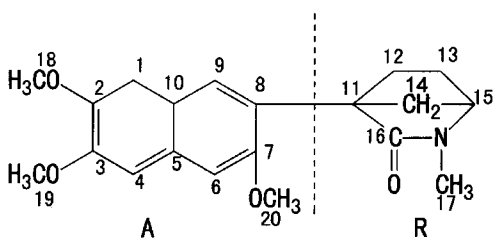

Fig.1 Structure of compound (I)

Table 1 ^{13}CNMR spectral data of compound (I) (100 MHz CDC_{13})

C	1	2	3	4	5	6	7	8	9	10
δ	110.8	148.1	148.1	112.5	129.0	122.7	161.5	151.4	118.6	128.7
Multiplicity	1	0	0	1	0	1	0	0	1	0
C	11	12	13	14	15	16	17	18	19	20
δ	43.2	32.7	41.1	45.6	60.6	180.8	41.3	55.1	55.8	56.3
Multiplicity	0	2	2	2	1	0	3	3	3	3

The multiplicity was provided by DEPT (135°and 90°) spectra.

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References

Chen Yaozu, 1983. Organic Analysis, Advanced Education Press, Beijing, p.607.

Huang Minlon, 1958. Relationship between IR and Structure of Organic Molecules. Science Press, Beijing, p.127.

Pan Yuanjinag and Chen Yaozu, 1992. A new diterpenoid alkaloid from *delphinium caeruleum* chinese. *Chemical Journal of Chinese Universities*, **11**:1418.

Pan Yuanjiang and Chen Yaozu, 1993. Diterpenoid alkaloids from *delphinium caeruleum*. *Planta Medica* **9**: 83.

Wang, Yan, Pan Yuanjiang and Chen Yaozu, 1996. Diterpenoid alkaloids from *delphinium caeruleum*. *Phytochemistry*, **42**: 569.

Wang Yan, Pan Yuanjiang and Chen Yaozu, 1996. A minor new diterpenoid alkaloid from *delphinium caeruleum*. *Chinese Chemical Letter*. **2**: 183.