FOUR NEW ALKALOIDS FROM

_Celastrus angulatus_

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The roots of _Celastrus angulatus_ Maxim. are used in folk medicine for antipyretic and anti-wandering arthritis purpose. It also has been used as insecticide[^1]. The seven alkaloids were isolated from the root-bark of this plant. They are all

![Alkaloid Structure](image)

1. \( R_1 = \text{OFu} \quad R_2 = \text{H}_3\text{C} - \text{CH} - \text{C} = \text{O} \)
2. \( R_1 = \text{OBz} \quad R_2 = \text{OCOCH}_3 \)
3. \( R_1 = \text{OFu} \quad R_2 = \text{CH}_2\text{CH}_2\text{CH}_3 \quad \text{C} = \text{O} \)
4. \( R_1 = \text{OFu} \quad R_2 = \text{OCOCH}_3 \)

![Structural Formulas](image)

_Fig. 1_

[^1]: Kunming Institute of Botany, Academia Sinica.
new natural products. In this note, we wish to report the structures of four of them, which are the prototype of a series of alkaloids present in the members of the celastraceae family. These alkaloids belong to mayteline-type. They were characterized by the presence of a nicotinoyl ester substituted on a highly oxygenated sesquiterpene nucleus. The structures of compounds 1, 2, 3 and 4 are shown in Fig. 1.

The formulas of compounds 1, 2, 3 and 4 by high-resolution mass spectrometer are as follows:

1, C₄₄H₆₄NO₁₃ (671.2676, calcd.: 671.2578; amorphous);
2, C₇₆H₆₃NO₁₁ (653.2516, calcd.: 653.2473; amorphous);
3, C₉₃H₇₂NO₁₀ (685.2624, calcd.: 685.2735; amorphous);
4, C₆₉H₇₇NO₁₀ (643.2327, calcd.: 643.2265; amorphous).

Intense peaks present in the mass spectra of these four compounds at m/z 95, 105, 106 and 124 were assigned to (C₃H₁₇O⁺), (C₃H₉O⁺), (C₂H₆NO⁺) and (C₃H₇NO⁺).

Table 1

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<td>1.70 m</td>
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<td>2.60 m</td>
<td>5.37 d(6.5)</td>
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<td>1.54 s</td>
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<td>1.52 s</td>
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<tr>
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Note: Chemical shifts in ppm are relative to internal TMS. Values in parentheses are coupling constants in Hz.

Table 2

<table>
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<th>Compd.</th>
<th>UV λmaxnm (logε)</th>
<th>IR νmaxcm⁻¹</th>
<th>MS (m/z)</th>
<th>(α)D(c0.5) (MeOH)</th>
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<tbody>
<tr>
<td>1</td>
<td>252(3.6176) 220(4.0286) 202(4.1323)</td>
<td>3500(br.) 1735(br.) 1590 1365 1240(br.) 870 760 740</td>
<td>671(M⁺) 656(M⁺-15) 629(M⁺-42)</td>
<td>551 124 106 95 71 43</td>
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<td>2</td>
<td>263(3.5005) 224(4.1181) 201(4.2442)</td>
<td>3500(br.) 1740(br.) 1590 1365 1235(br.) 870 740 715</td>
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<td>533 516 124 106 105 43</td>
</tr>
<tr>
<td>3</td>
<td>254.5(3.6043) 222(4.0946) 201.5(4.1619)</td>
<td>3500(br.) 1740(br.) 1590 1365 1230(br.) 870 760 740</td>
<td>685(M⁺) 670(M⁺-15) 643(M⁺-42)</td>
<td>565 124 106 95 85 43</td>
</tr>
<tr>
<td>4</td>
<td>256(3.6451) 204(4.3889)</td>
<td>350(br.) 1740(br.) 1590 1365 1235(br.) 870 760 740</td>
<td>643(M⁺) 628(M⁺-15) 601(M⁺-42)</td>
<td>523 124 106 95 43</td>
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</table>
respectively. The mass spectral fragmentations of compounds 1, 2, 3 and 4 were similar and all showed ions for the loss of CH₃ and CH₂CO from the molecular ions. The infrared spectra showed the presence of free hydroxy (3500 cm⁻¹, br.) and ester group (1740 cm⁻¹, br.). The ¹H-NMR (400 MHz) spectral data of these compounds are shown in Table 1.

In the ¹H-¹H COSY of compound 1, the cross peaks between H-1 and H-2, H-8 and H-9, H-8 and H-7, H₅-11 and H₆-11 were observed. It also showed the cross peaks between 4-OH and H-3, 4-OH and H-12. The NOESY of compound 1 showed the cross peaks between H-9 and H₄-11, H₄-11 and H₅-11, H-6 and H-7, H-8 and H-7, 4-OH and H-3. The ¹³C-NMR chemical shifts of compound 1 (from C-1 to C-15) are respectively as follows: 68.2, 68.1, 29.3, 65.3, 91.1, 78.5, 48.9, 34.2, 71.6, 55.1, 69.7, 41.9, 84.6, 25.2 and 25.6 (solvent in CDCl₃).

These data were analyzed and compared with related compounds²⁻⁹. The position and configuration of the substituents were proposed as shown in Fig. 1. The continuing work and test of physiological effect are in progress.

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REFERENCES