

The constituents of *Taxus Chinensis* Rehd.

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紅豆杉之成分研究

Introduction

The Taiwan yew, *Taxus Chinensis* Rehd., which is an indecious arbor belonging to Taxaceae grows wild in the remote mountainous districts of Taiwan.

The barks of the plant have been used as anti-diabetic agent and the extracts of leaves show antitumor effect.

In the same species of Japanese yew, *Taxus Cuspidata* Sieb. et. Zucc., Kondo et al⁽¹⁾ (1925) have isolated taxinine, a diterpenoid, and the structure was finally determined by an X-ray study⁽²⁾ in 1966.

In 1968, author et al⁽³⁾⁽⁴⁾ carefully separated and determined the structure of the seven new compounds of taxinine A, taxinine B, taxinine E, taxinine H, taxinine J, taxinine K, and taxinine L, in which taxinine A shows antitumor effect.

In this study, β -sitosterol, taxinine, and taxinine A were isolated from the Taiwan yew. The minor constituents of Taiwan yew are under further investigation.

Experimental

(a) Extraction and separation

Taiwan yew leaves (5 kg) which had been dried in the shade for 2 weeks were cut and soaked in ethyl acetate (15 l) with occasional stirring for 2 weeks and the extracts were separated from the leaves, which were then twice re-extracted by the same method.

The combined extracts were evaporated in vacuo to give a dark

green paste which was further heated on water bath for 2 hours. This paste (55 g) was extracted with chloroform (500 ml) and then evaporated to dryness. The residue (25 g) was washed with petroleum ether (300 ml) and extracted with benzene (200 ml), and evaporated to dryness to give a green paste (5 g).

The green paste (5 g) was chromatographed on silica gel (1 kg, merck) and eluted with benzene/ethyl acetate (4 : 1)

(b) Separation of β -sitosterol

The elution from the first band was recrystallized from ethyl alcohol to afford plate(I), m.p. 139-140°, yield 30 mg.

Analysis; Found: C, 83.72 ; H, 12.05%

Calcd. for $C_{29}H_{50}O$: C, 83.99 ; H, 12.15%

$[\alpha]_D^{25}$: -36° (c=2, $CHCl_3$)

(I) was identified as β -sitosterol ($C_{29}H_{50}O$, m. p. 140°) by mixed melting points and IR spectra of authentic sample.

(c) Separation of taxinine

The elution from the second band was recrystallized from methanol to afford prism(II), m.p. 266-267°; yield 50 mg.

Analysis; Found: C, 69.41 ; H, 6.81 %

Calcd. for $C_{35}H_{42}O_9$: C, 69.29 ; H, 6.98 %

$[\alpha]_D^{25}$: +128° (c=1, $CHCl_3$)

UV(MeOH) : 217 (20,000), 223 (16,000), 278m μ (28,500)

IR (Nujol) : 1739 (OAc), 1714 (cinnamate), 1669 (C=C-CO),
1639 cm^{-1} (cinnamate, C=C)

(II) was identified as taxinine ($C_{35}H_{42}O_9$, m.p. 267°) by mixed melting points, UV and IR spectra of the authentic sample.

(d) Separation of taxinine A

The third eluate was recrystallized from ether three times to afford prisms (III), m.p. 254-255°, yield 20 mg.

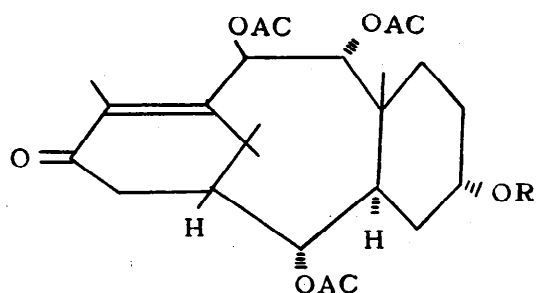
Analysis; Found : C, 65.29 ; H, 7.51%

Calcd. for $C_{26}H_{36}O_8$: C, 65.53 ; H, 7.61%

UV (MeOH) : 270 $m\mu$ (4,400)

IR (KBr) : 3520(OH), 1740, 1730 and 1245(OAc), 1675(C=C-CO)
911 cm^{-1} (C=C)

(III) was identified as taxinine A ($C_{26}H_{36}O_8$, m.p. 255°) by mixed melting points, UV and IR spectra of the authentic sample.



Taxinine, R=COCH=CHPh

Taxinine A, R=H

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Summary

β -sitosterol, taxinine ($C_{35}H_{42}O_9$) and taxinine A ($C_{26}H_{36}O_8$) were isolated from Taxus Chinensis Rehd. The constituents isolated in this study are similar to those in Taxus Cuspidata Sieb. et Zucc. But the minor constituents of Taxus Chinensis Rohd. need further investigation.

Acknowledgment

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References

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中文摘要

紅豆杉之成分研究

紅豆杉 (*Taxus Chinensis* Rehd.) 葉之成份經研究結果，含有 β -sitosterol 及屬於 diterpene 之 taxinine ($C_{35}H_{42}O_9$) 與 taxinine A ($C_{26}H_{36}O_8$)。由紅豆杉葉所抽出的這些成份與紫杉 (*Taxus Cuspidata* Sieb. et Zucc.) 葉所含成份相似。但對其他微量成份有再詳細檢討之必要。