

The Chemical Constituents Study on Umbelliferous Plants in Taiwan

(XV) On the coumarins from the roots of *Glehnia littoralis* Fr. Schmidt

by

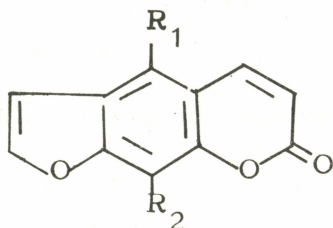
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Glehnia littoralis Fr. Schmidt (Umbelliferae) is a perennial herb growing in northern Taiwan and is called "珊瑚菜" (Shan-Hwu-Tsay) which is used as a diaphoretic for substituter of "防風 (Fan-Fong)" in Taiwan.¹⁾ The root has been known to be an effective remedy for anticough, expactorant, chronic brochitis, tuberculosis, antipyretic, anethetic in China. And be used as a folk medicine for apoplexy prevention, hypertension, angiosclerosis.²⁾

From the seed had been studied in 1940.³⁾ But there is no record of chemical investigation on the root of this plant in literatures. From the ethereal extract of the dried root of this plant upon fraction over the column of silica-gel afforded 2 kinds of coumarin derivatives. (I), mp. 192-3°, fine colorless needles; (II), mp. 143-5°, colorless needles.

In view of the IR spectrum, melting point and chemical properties identified by the comparison with authentic sample, the compound (I) and (II) were suggested to be bergapten and xanthotoxin.



(I) Bergapten $R_1 = \text{OCH}_3$, $R_2 = \text{H}$

(II) Xanthotoxin $R_1 = \text{H}$, $R_2 = \text{OCH}_3$

Experimental

Isolation of coumarins --- The dried and crush roots (2 Kg) of *Glehnia littoralis* collected in Taipei county (台北縣) of Taiwan in September, 1974 was extracted with three times of ether at room temperature for 2 weeks. The ether solution was concentrated to brown oil (50 ml).

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It was chromatographed over the column of silicic acid (Merck, 70-325 mesh ASTM) with *n*-hexane. An oil substance is afforded initially (Fr.1, Fr.2). Then using *n*-hexane : ethyl acetate (3:1), crystal (I), (II) were afforded and recrystallized from ethanol.

(I) Bergapten --- The yellowish crystalline solid from Fr.3 and 4 was decolorization with activated carbon and recrystallized from ethanol, it giving colorless fine needles (I) mp.192-3°, $C_{12}H_8O_4$,

Anal. Calcd.: C, 66.67; H, 3.75
Found: C, 66.97; H, 3.87

The IR spectrum and Co-TLC are entirely identical to bergapten. The melting point showed no depression on admixture with authentic sample of bergapten.

(II) Xanthotoxin --- The crystalline solid from Fr.5 was decolorized with active carbon and recrystallized from ethanol giving colorless needles (II) mp.146-8°, $C_{12}H_8O_4$

Anal. Calcd.: C, 66.67; H, 3.73
Found : C, 66.64; H, 3.66

The IR spectrum and Co-TLC entirely identical to xanthotoxin. The mixed melting point with authentic sample of xanthotoxin did not show any depression.

References

- 1) W.S.Gan: Manual of Medicinal Plants in Taiwan, Vol. 3, p. 665 (1970)
- 2) H.Takikim et al: Bulletin of Gifu Medical College, 88. 464, 471 (1960)
- 3) K.Noguchi et al: Yakugaku Zasshi (Japan), 66, 57 (1940)

Summary

Two coumarins -- bergapten and xanthotoxin were isolated from the roots of Glennia littoralis.

中文摘要

臺灣產繖形科植物有效成分之研究

第十五報： 珊瑚菜之成分

楊玲玲 顏焜熒

台北醫學院 生藥化學科

臺北縣富貴角海濱沙丘地採集珊瑚菜 (*Glehnia littoralis*) 之乾燥根(2公斤)，由其乙醚抽取液中分離得到二種 Coumarin 衍—— bergapten 及 xanthotoxin。
〔本論文內容已以簡報形式投稿於台灣藥學雜誌，第二十九卷，第一期(1977)〕