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TOXIC FUROCOUMARINS OF *CYMOPTERUS LONGIPES*

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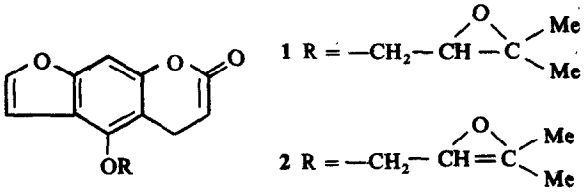
Key Word Index—*Cymopterus longipes*; Umbelliferae; phototoxins; furocoumarins; oxypeucedanin; isoimperatorin.

It was previously reported [1, 2] that plants of *Cymopterus watsonii* (Coult. and Rose) Jones were phototoxic in a chick bioassay and were found to contain the furocoumarins xanthotoxin, bergapten, isopimpinellin, heraclenol and byankangelicin. It was discovered recently [3] that seeds of *C. longipes* S. Wats. were also highly phototoxic in the chick bioassay and were both phototoxic and acutely poisonous to young turkeys. We therefore undertook a study to determine the toxic components of *C. longipes*.

Ground seed was Soxhlet extracted with MeOH, H_2O was added and the solution extracted with petrol. Evaporation of the petrol left a residue which was subjected to column chromatography purification. Two known furocoumarins were isolated: (+)-oxypeucedanin (0.1%), **1**, and isoimperatorin (0.008%), **2**.

In the chick bioassay (which involves feeding followed by exposure to light), isoimperatorin was found to be very highly phototoxic, while oxypeucedanin was toxic, but considerably less so. An earlier report [4] stated that isoimperatorin was active in an erythema-producing topical test, but that oxypeucedanin was not active.

None of the furocoumarins previously found [2] in *C. watsonii* was present in *C. longipes*.



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EXPERIMENTAL

General procedures. Mp's are uncorr. UV and IR spectra were taken in EtOH and $CHCl_3$, respectively. Merck Si gel F-254 (0.25 mm) plates were used for TLC. NMR spectra were taken in $CDCl_3$ on either 60 or 100 MHz instruments. LPLC was run on an Altex column (3 × 100 cm) at (7 kg cm^{-2}) with Woelm Si gel (0.032–0.063 mm mesh).

Extraction and isolation. Dried, ground seeds (100 g) of *C. longipes* which had been collected west of Logan, Utah, in May 1976 (Intermountain Herbarium Specimen #107983), were Soxhlet extracted with MeOH. The MeOH was diluted with H_2O to give a 2:1 H_2O–MeOH soln that was extracted continuously with petrol. The petrol was evap. to yield 11.5 g of green oil. TLC examination of this residue showed yellow fluorescent (long wave length) spot at R_f 0.52 and 0.61 (2% MeOH in $CHCl_3$). Comparison TLC showed no xanthotoxin, bergapten, isopimpinellin, heraclenol or byankangelicin (the components of *C. watsonii*). The 11.5 g residue was passed through a 6 × 25 cm Si gel column with 2% MeOH in $CHCl_3$ to yield 8.4 g of green oil, which by rechromatography twice on LPLC (first with 2% MeOH–$CHCl_3$ and second with 5% ether in $CHCl_3$) yielded 100 mg of (+)-oxypeucedanin, mp 94–95° (R_f 0.52) and 8 mg of isoimperatorin (R_f 0.61). Oxypeucedanin was identical by mp, IR, MS and optical rotation to an authentic sample provided by Dr. Warren Steck. Isoimperatorin was identical by UV, NMR and co-chromatography in two solvents with an authentic sample provided by Dr. James Kutney.

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