

natural occurrence of moretenol and the first in the Ulmaceae.

Elution with light petrol- $\text{CHCl}_3$  (1:9) gave a sterol mixture which crystallized from  $\text{CHCl}_3$ -MeOH (460 mg); mp  $135$ – $137^\circ$ .  $\nu_{\text{max}}^{\text{KBr}}$   $\text{cm}^{-1}$ : 3430, 2950, 2930, 2860, 1640, 1460, 1380, 1060, 1050, 1020, 960 and 800. GLC on a 160 cm column of 0.8% OV-17 on Gas Chrom Q (80–100 mesh) showed the mixture to be composed of sitosterol (82%) and stigmasterol (18%). The identity was confirmed by GC-MS.

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### COUMARINS FROM *HERACLEUM WALLICHII* AND *H. NEPALENSE*

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**Key Word Index**—*Heracleum wallichii*; *Heracleum nepalense*; Umbelliferae; coumarins; isobergapten; bergapten; isopimpinellin; sphondin.

*Plant Heracleum wallichii* DC. (Voucher specimen No. 12725, deposited at Survey and Herbarium Division, R.R.L., Jammu). *Source*. The Himalayas, 10000–12000 ft. *Previous work*. Nil.

*Present work*. The petrol. (bp  $60$ – $80^\circ$ ) extract of the roots on chromatography over  $\text{SiO}_2$  gel afforded (a) isobergapten (petrol- $\text{C}_6\text{H}_6$  (2:1) eluate),  $\text{C}_{12}\text{H}_8\text{O}_4$ , mp  $220$ – $222^\circ$ , confirmed by IR and NMR, (b) bergapten (petrol- $\text{C}_6\text{H}_6$  (1:1) eluate),  $\text{C}_{12}\text{H}_8\text{O}_4$ , mp  $188$ – $189^\circ$ , confirmed by IR, NMR and co-TLC with authentic sample and (c) a crystalline fraction ( $\text{C}_6\text{H}_6$ - $\text{CHCl}_3$  (2:1) eluate) showing 2 spots on TLC. This mixture on rechromatography over  $\text{SiO}_2$  gel furnished (d) isopimpinellin (pale yellow needles),  $\text{C}_{13}\text{H}_{10}\text{O}_5$ , mp  $150$ – $151^\circ$ , confirmed by IR, NMR and TLC and (e) sphondin,  $\text{C}_{12}\text{H}_8\text{O}_4$ , mp  $191$ – $192^\circ$ , confirmed by IR, NMR and TLC.  $R_f$  values of isobergapten, bergapten, isopimpinellin and sphondin on  $\text{SiO}_2$  gel were found to be 0.61, 0.52, 0.31 and 0.25 respectively in cyclohexane-EtOAc (3:1) system.

*Plant. Heracleum nepalense* D. Don (Voucher specimen No. 13208, deposited at Survey and

Herbarium Division, R.R.L., Jammu). *Source*. The Himalayas, 10000–12000 ft. *Previous work*. On seeds [1].

*Present work*. The petrol (bp  $60$ – $80^\circ$ ) extract of the roots on chromatography over  $\text{SiO}_2$  gel yielded isobergapten, bergapten, isopimpinellin and sphondin.

*Heracleum* plants are noted for their rich furanocoumarin content. Furanocoumarins are effective dermal photosensitizing agents [2] and are widely used in the treatment of leucoderma and in various 'Suntan' lotions. The furanocoumarin (total) contents of *Heracleum wallichii* and *H. nepalense* are about 1.2% and 1.5% respectively.

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