

COUMARINS OF THE ROOTS OF *Heracleum carpaticum*, *H. ligusticifolium*, AND *Symphyloloma graveolens*

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When ethanolic extracts of the roots of *Heracleum carpaticum* Porc., *H. ligusticifolium* M. B., and *Symphyloloma graveolens* C. A. M. were chromatographed on paper in petroleum ether-formamide and chloroform-formamide systems, not less than 10, 15, and 15 substances, respectively, of coumarin nature were detected, and these have been isolated by known methods [1].

From *H. carpaticum* we obtained angelicin ($C_{11}H_6O_3$, mp 138-140°C), bergapten ($C_{12}H_8O_4$, mp 189-191°C), sphondin ($C_{12}H_8O_4$, mp 190-191°C), and isopimpinellin ($C_{13}H_{10}O_5$, mp 149-151°C); psoralen was detected chromatographically. From *H. ligusticifolium*, in addition to angelicin, bergapten, sphondin, and isopimpinellin, we isolated psoralen ($C_{11}H_6O_3$, mp 161-163°C), imperatorin ($C_{16}H_{14}O_4$, mp 102-103°C), isobergapten ($C_{12}H_8O_4$, mp 222-224°C) and pimpinellin, ($C_{13}H_{10}O_5$, mp 117-119°C).

On isolating the furocoumarins from the roots of *Symphyloloma graveolens* we obtained isobergapten, sphondin, pimpinellin, psoralen, bergapten, isopimpinellin, and imperatorin.

The compounds were identified by a comparison of physicochemical properties, melting points, and IR spectra of the substances isolated and of authentic samples, and by mixed melting points.

Of hydroxycoumarins, by paper chromatography in the chloroform-formamide system we found scopoletin and umbelliferone in the species investigated.

It must be mentioned that the qualitative composition of the coumarins of *Symphyloloma graveolens* is close to that of the genus *Heracleum* [2].

LITERATURE CITED

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