FUROCOUMARINS OF PSORALEA DRUPACEAE

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The composition of the furocoumarins of Psoralea drupaceae Bge. (drupe scurfpea), family Leguminosae has been studied. It has been found photometrically that the kernel of the seeds contains 1.36%, the seed hull 0.07%, the seed as a whole 0.92%, the leaves 0.06%, and the roots 0.36% of total furocoumarins on the air-dry weight of the raw material.

To obtain the furocoumarins, a methanolic extract of the plant raw material was concentrated and was freed from resinous substances by shaking with gasoline, the furocoumarins were transferred into benzene, and the benzene solution was filtered through a layer of alumina and evaporated to dryness.

The mixture of coumarins obtained in this way was dissolved in a 100-fold volume of ether. A crystalline compound with the composition $C_{11}H_6O_3$ and mp 161°-162° C (from ethanol) deposited. (Found, %: C 71.00; H 3.32). The substance was optically inactive. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 243, 295, 330 mμ (log ε 4.56, 4.21, 3.96); IR spectrum [1]: 1361, 3122, 3064 (C-H bond), 1732 (C=O), 1636 (C=C), 1581 (aromatic ring) cm^{-1}. All these properties correspond to psoralen [2, 4].

The ethereal solution after the elimination of the psoralen was evaporated and the residue was transferred to a column of alumina. When the column was eluted with benzene, the first fractions yielded an optically inactive crystalline compound with the composition $C_{11}H_6O_3$ having mp 139°-140° C (Found, %: C 71.02; H 3.20). UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 246, 298 mμ (log ε 4.62, 4.18). IR spectrum: 3161, 3122, 3064 (C-H bond), 1743 (C=O), 1622 (C=C), 1583, 1543 (aromatic ring) cm^{-1}. All these properties correspond to angelicin (isopsoralen) [3, 4].

The individuality of the furocoumarins obtained was confirmed by paper chromatography in the n-hexane-benzene-methanol (5:4:1) system. On treatment with diazotized sulfanilic acid, the psoralen spot was lilac and that of angelicin orange. The NMR spectra of the compounds that we isolated have been given previously [5].

The ratio between the psoralen and angelicin is approximately the same in all the organs of the plant (1:1). The mixture of psoralen and isopsoralen from P. drupaceae [6] is used as a medicinal preparation in the treatment of vitiligo [7]. Sucrose has also been isolated from the roots of the plant with a yield of 1%.

REFERENCES

1. M. E. Perel'son, ZhOKh, 33, 952, 1963.

2. H. S. Jois, B. L. Manjunath, and S. V. Rao, J. Ind. Chem. Soc., 10, 41, 1933; C., 2, 77, 1933; E. Späth, B. L. Manjunath, M. Pailer, and H. S. Jois, Ber., 69, 1087, 1936.

3. E. Späth and O. Pesta, Ber., 67, 853, 1934; H. S. Jois and B. L. Manjunath, Ber., 69, 964, 1936.

4. H. K. Khastgir, P. C. Duttagupta, and P. Sengupta, Ind. J. Appl. Chem., 22, 82, 1959.

5. Yu. N. Sheinker, G. Yu. Pek, and M. E. Perel'son, DAN SSSR, 158, 1382, 1964.

6. N. K. Abubakirov and U. F. Khalmurzaev, USSR author's certificate no. 164411, 1964; Byull isobr. no. 15, 53, 1964.

7. A. A. Akovbyan and K. P. Kamzolova, Vest. dermat. i vener., no. 5, 33, 1961.

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