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SHORT COMMUNICATION

FLAVONES OF *IVA HAYESIANA*

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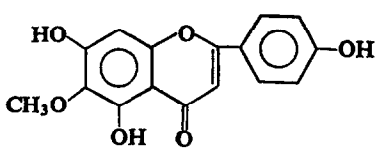
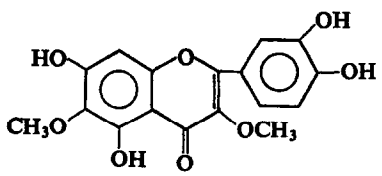
Abstract—Extraction of *Iva hayesiana* Gray gave a sesquiterpene lactone which polymerized and the flavones hispidulin and axillarin.

AS PART of our systematic study of the North American genus *Iva*, we examined a collection of *Iva hayesiana* (Compositae) whose distribution is limited to Southern California and Baja California.[2] The above-ground parts yielded the known flavones hispudulin (I)[3] and axillarin (II);[4] the species also contains a sesquiterpene lactone which, however, polymerized on exposure to air and could not be characterized satisfactorily.



Hispidulin (I)



Axillarin (II)

EXPERIMENTAL

The plant was collected by Mrs. E. E. Norland and Mr. Mitchel Beauchamp near San Diego, California, in September 1964. Extraction of 2·85 kg of above-ground parts in the usual manner[5] furnished 65 g of crude gum which was chromatographed over 330 g of silicic acid (Mallinckrodt 100 mesh), 400 ml fractions being collected. Fractions 1–18 (benzene) eluted nothing or oils, fractions 19–26 (benzene–$CHCl_3$, 3:1) and 27–35 (benzene–$CHCl_3$, 2:1) eluted gum. Fractions 36–42 (benzene–$CHCl_3$, 1:1), 43–50 (benzene–$CHCl_3$, 1:2), 51–58 (benzene–$CHCl_3$, 1:3) gave white polymeric lactone (lactone group by i.r. spectroscopy) insoluble in all organic solvents and water. Attempts to isolate the monomer prior to polymerization were futile. Fractions 59–63 ($CHCl_3$) gave a gum, fractions 63–67 gave 0·15 g of a flavone which was recrystallized from acetone–$CHCl_3$, acetonitrile–benzene and acetone–benzene and then melted at 288°. It was identified as hispidulin (I)

[1] "Constituents of *Iva* Species-XI." Previous paper, W. HERZ, Y. SUMI, V. SUDARSANAM and D. RAULAIS, *J. Org. Chem.* **32**, 3658 (1967).
[2] R. C. JACKSON, *Univ. Kansas Sci. Bull.* **41**, 793 (1960).
[3] W. HERZ and Y. SUMI, *J. Org. Chem.* **29**, 3438 (1964).
[4] W. HERZ, L. FARKAS, V. SUDARSANAM, H. WAGNER, L. HÖRHAMMER and R. RÜGER, *Chem. Ber.* **99**, 3539 (1966).
[5] W. HERZ and G. HÖGENAUER, *J. Org. Chem.* **27**, 905 (1962).

by i.r. and NMR spectrum and by comparison with an authentic sample.[3] Fractions 68–70 ($CHCl_3$–ether, 10:1) gave gums, fractions 70–75 ($CHCl_3$–ether, 5:1) gave 0·1 g of a flavone which, after recrystallization from acetone–$CHCl_3$, melted at 210–212°, i.r. and NMR spectrum identical with that of axillarin (II), m.m.p. with an authentic sample[4] not depressed.

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