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3′,4′-METHYLENEDIOXY-7-HYDROXY-6-ISOPENTENYL FLAVONE, A NEW FLAVONE FROM *FAGOPYRUM CYMOSUM*

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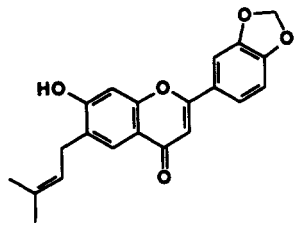
ABSTRACT.—The EtOAc-soluble portion of the concentrated EtOH extract of the stem of *Fagopyrum cymosum*, when separated by cc, yielded 3′,4′-methylenedioxy-7-hydroxy-6-isopentenyl flavone [**1**].

Fagopyrum cymosum Meissn. (Polygonaceae) is found from Kashmir to Sikkim (1). The stem is cooked and eaten as a vegetable, while its seeds are used in colic, choleraic diarrheal fluxes, and abdominal obstructions. The occurrence of rutin, along with other flavonoid compounds (2,3), in *Fagopyrum* species has already been reported by earlier workers. Previously the MeOH-soluble extract of the stems yielded a new acylated flavanone, 3′,4′-dihydroxy-7-*O*-(2″-*p*-benzoyl)-β-D-glucopyranoside (4).

The EtOAc-soluble part of the concentrated EtOH extract of the stem of *F. cymosum*, when subjected to cc, yielded cream-colored plates which analyzed for $C_{21}H_{18}O_5$. This compound **1** gave all the characteristic color reactions of flavones (5–7) and formed a monoacetate (Ac_2O/pyridine), confirming the presence of one hydroxyl group. The position of the hydroxyl group at C-7 was determined by the uv shift in band II on addition of NaOAc; ^{1}H-nmr spectral data showed peaks at δ 3.40 (2H, d, J = 6.5, -CH_2-), 5.30 (1H, t, J = 7, -CH=), 1.67 (6H, s, Me characteristic of a prenyl unit) (8).



1

The eims of **1** gave peaks at *m/z* 146 and 134, typical of a methylene-dioxy-substituted B ring (9); therefore, the prenyl unit must be present in ring A because the ^{1}H nmr gave a singlet at δ 7.08 for H-3.

On heating with HCO_2H, compound **1** yielded 2,2′-dimethyl chroman, which did not indicate a peak for a hydroxyl group in its ir spectrum; therefore, the prenyl unit must be adjacent to the hydroxyl group, i.e., at C-6 or C-8. The C-8 position was ruled out because the ^{1}H nmr of the flavone did not show three coupled protons with an ABB′ pattern.

The position of the prenyl unit was fixed at C-6 due to the presence of aromatic AB protons having para coupling (J = 2.8 Hz). The position of the methylenedioxy group was fixed at 3′,4′ due to the presence of three signals of aromatic protons of an ABB′ system showing a double doublet (J = 9 Hz and J = 6.4 Hz). Thus, **1** was concluded to be 3′,4′-methylenedioxy-7-hydroxy-6-isopentenyl flavone, a new flavone.

EXPERIMENTAL

PLANT MATERIAL.—The dried plant *F. cymosum* was supplied by the Himalaya Range Drug Field, Simla, and authenticated by the Chairman, Department of Botany, Dr. Harisingh Gour University, Sagar, India; an herbarium specimen (No. V-XVI) has been deposited in room no. 36 of the Chemistry Department.

ISOLATION AND IDENTIFICATION OF **1**.—Powdered stems of *F. cymosum* (3 kg) were extracted with 95% EtOH. The concentrated extract was subjected to successive extractions with C_6H_6, $CHCl_3$, and EtOAc. The EtOAc residue, on Si gel G cc [EtOAc-MeOH (2:3)], gave the

new compound which crystallized from Et_2O as cream-colored plates. It analyzed for $C_{21}H_{18}O_5$: mol. wt. 350; mp 181–183°; uv λ max (MeOH) 246, 308 nm, λ max (MeOH + NaOAc) 256, 310 nm; ir ν max (KBr) 3450, 1665, 1625, 1500, 1422, 940; ^{1}H nmr (100 MHz, $CDCl_3$, ppm) 7.60 (1H, d, J = 2, H-2′), 7.54 (1H, dd, J = 8, 2, H-6′), 7.40 (1H, s, H-5), 7.08 (1H, s, H-3), 6.92 (1H, s, H-8), 6.90 (1H, d, J = 8, H-5′), 6.08 (2H, s, O-CH_2O), 5.30 (1H, t, J = 7, -CH=), 3.40 (2H, d, J = 6.5, -CH_2-), 1.67 (6H, s, 2 Me's); ^{13}C nmr (20.0 MHz, $CDCl_3$) ppm 125.00 (C-1′), 109.48 (C-2′), 145.23 (C-4′), 107.04 (C-5′), 120.46 (C-6′), 102.43 (O-CH_2O), 162.40 (C-2), 101.40 (C-3), 172.30 (C-4), 126.40 (C-5), 110.80 (C-6), 161.20 (C-7), 92.00 (C-8), 20.80 (C-1″), 122.40 (C-2″), 130.20 (C-3″), 25.6 (C-4″) and 17.4 (C-5″); eims m/z [M]$^+$ 350, 349, 184, 150, 146, 145, 134, 122.

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