

**Compound 1.** 2',4'-dihydroxy-6'-methoxychalcone.  $R_f$  0.48 (A), 0.47 (B). Dark spot on polyamide, no reaction with "Naturstoffreagenz A". Mp 188°. UV (EtOH)  $\lambda_{\max}$  345 nm, with  $\text{AlCl}_3$  shift to 362 nm, with  $\text{NaOEt}$  shift to 394 nm. MS:  $m/e$  270 ( $\text{M}^+$ , 80%), 269 (60), 242 (6), 193 (100), 167 (36), 166 (20), 103 (14), 77 (16). NMR (trimethylsilyl derivative in  $\text{CCl}_4$ ):  $-\text{OCH}_3$  (s, 3.70  $\delta$ ),  $-(\text{Ar})\text{H}$  (d, 5.85  $\delta$ ;  $J$  2.5 Hz),  $-(\text{Ar})\text{H}$  (d, 5.98  $\delta$ ,  $J$  2.5 Hz),  $-\text{H}$  (d, 6.79  $\delta$ ,  $J$  17 Hz), 6 H (m, 7.2–7.6  $\delta$ ).

**Compound 2.** Galangin 3-methyl ether.  $R_f$  0.59 (A), 0.51 (B). Dark spot on polyamide, light brown with Naturstoffreagenz. M.p. 297°. UV  $\lambda_{\max}$  (345, sh), 268 nm, with  $\text{AlCl}_3$  397, 332, 279 and 252 nm, MS  $m/e$  284 ( $\text{M}^+$ , 100%), 283 (85), 269 (4), 266 (10), 255 (6), 253 (8), 241 (6), 207 (2), 193 (4), 171 (6), 153 (6), 152 (6), 105 (10), 77 (15). NMR (trimethylsilyl derivative in  $\text{CCl}_4$ ):  $-\text{OMe}$  (s, 3.80  $\delta$ ),  $-\text{H}$  (d, 6.11  $\delta$ ,  $J$  2.5 Hz),  $-\text{H}$  (d, 6.45  $\delta$ ,  $J$  2.5 Hz), 3 H (m, 7.43  $\delta$ ), 2 H (m, 8.05  $\delta$ ).

**Compound 3.** Galangin  $R_f$  0.46 (A), 0.21 (B). Orange–yellow spot on polyamide, greenish yellow with Naturstoffreagenz. M.p. 220°. UV  $\lambda_{\max}$  362 and 268 nm, with  $\text{AlCl}_3$  419, 338, 275 and 251 nm.

Galangin and its 3-methyl ether have also been found together recently in buds of *Populus nigra*.<sup>4</sup> The chalcone I was first isolated from roots of a New Guinea *Piper* sp. (alpinetinchalkon),<sup>5</sup> and later from seeds of *Alpinia katsumadai* (cardamonin)<sup>6</sup> and *A. specios*.<sup>7</sup> The flavonoids found in bud excretion (and on male flowers) of *Alnus viridis* (I–III) are completely different from those described earlier from *A. glutinosa*<sup>2</sup> and other species still under investigation. In 14 species of *Alnus* and 25 species of *Betula*, I is the only chalcone encountered.

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<sup>5</sup> SAUER, H. V. and HÄNSEL, R. (1967) *Planta Medica* **15**, 443.

<sup>6</sup> KIMURA, Y., TAKAHASHI, S. and YOSHIDA, I. (1968) *Yakugaku Zasshi* **88**, 329.

<sup>7</sup> KRISHNA, B. M. and CHAGANTY, R. B. (1973) *Phytochemistry* **12**, 238.

## BIFLAVONES FROM *MANIHOT UTILISSIMA*

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**Key Word Index**—*Manihot utilissima*; Euphorbiaceae; biflavones; amentoflavone; podocarpusflavone A.

*Plant.* *Manihot utilissima*. Pohl (*M. esculenta* Crantz) (Euphorbiaceae) *Source.* Collected at Aleem Nursery, Aligarh Muslim University, Aligarh, India.

*Previous Work.* Isolation of quercetin-3-rhamnosylglycoside.<sup>1</sup>

*Present Work.* The phenolic extract obtained from fresh leaves and purified by usual methods gave two biflavones by preparative TLC. They were characterized as amentoflavone and podocarpus-flavone A (4'''-O-methyl amentoflavone), by m.p.s. m.m.p.s. and comparison of NMR spectra of their methyl and acetyl derivatives with those of authentic samples.

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## ALKALOIDS FROM *CORYDALIS INCISA*\*

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**Key Word Index**—*Corydalis incisa*; Papaveraceae; phenolic protoberberine alkaloids; (–)-cheilanthifoline; (–)-scoulerine; coreximine; (+)-reticuline.

*Plant.* *Corydalis incisa* Pers. in the vegetative stage. *Source.* Fukuoka Prefecture, Japan. *Previous work.* Non-phenolic tertiary<sup>1-3</sup> and quaternary<sup>2</sup> alkaloids.

*Present work.* The MeOH extract of the whole plant was worked up as described earlier.<sup>3</sup> The tertiary phenolic base fraction (0.035% of dried material) was subjected to chromatography over silica gel. The CHCl<sub>3</sub> eluate gave a mixture which was re-chromatographed over silica gel with hexane-AcOEt (2:1) to afford (–)-*cheilanthifoline*, m.p. 176–177°, [α]<sub>D</sub><sup>20</sup> –321° (MeOH) (0.007%, m.p., [α]<sub>D</sub><sup>20</sup>, IR. Methylation with diazomethan gave (–)-*sinactine* and (–)-*scoulerine*, m.p. 194–196°, [α]<sub>D</sub><sup>20</sup> –304° (EtOH) (0.005%, m.p., [α]<sub>D</sub><sup>20</sup>, IR). The CHCl<sub>3</sub>-MeOH (99:1) eluate gave *coreximine*, m.p. 252–254°, [α]<sub>D</sub><sup>20</sup> –280° (CHCl<sub>3</sub>) (0.006%, m.p., IR). The CHCl<sub>3</sub>-MeOH (19:1) eluate was purified by preparative TLC followed by recrystallization as perchlorate, yielding (+)-*reticuline* perchlorate, m.p. 203–204° (0.005%, IR, free base: [α]<sub>D</sub><sup>20</sup> +96° (EtOH), [α]<sub>D</sub><sup>20</sup>, IR).

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\* Part IV in the series "Alkaloids of *Corydalis incisa* Pers.". For Part III see NONAKA, G. and NISHIOKA, I. (1973) *Chem. Pharm. Bull.* **21**, 1410.

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<sup>2</sup> TANI, C. and TAKAO, N. (1962) *Yakugaku Zasshi* **82**, 594, 598.

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