

BENZOPHENANTHRIDINE ALKALOIDS FROM THE SEEDS OF  
*COPTIS JAPONICA* VAR. *DISSECTA*

MIZUO MIZUNO,\* HIROYUKI KOJIMA, TOSHIYUKI TANAKA, MUNEKAZU IINUMA,

*Department of Pharmacognosy, Gifu Pharmaceutical University, 6-1 Mitabora-higashi 5 chome, Gifu 502, Japan*

MIN ZHI-DA,

*Department of Phytochemistry, Nanjing College of Pharmacy, Nanjing, China*

and HIROKO MURATA

*Faculty of Pharmaceutical Science, Setsunan University, 45-1 Nagaotoge-cho, Hirakata, Osaka 571-01, Japan*

The rhizomes of *Coptis* spp. are used as an important crude drug in both China and Japan. Previous phytochemical studies showed the presence of many alkaloids, including berberine, coptisine, palmatine, and magnoflorine (1,2). Our present investigation on the constituents in the seeds of *Coptis japonica* (Thunb.) Makino var. *dissecta* (Yatabe) Nakai (Japanese name; seriba-ohren), yielded four alkaloids with benzophenanthridine skeletons, i.e., 6-acetonyl-5,6-dihydrosanguinarine (3-8), sanguinarine (3,4,8), norsanguinarine (3,4,8), and oxysanguinarine (3,4,8). These alkaloids, which are usually contained in the Papaveraceae and Rutaceae (3), we report for the first time in the Ranunculaceae. Their respective structures were determined by comparison with authentic samples. The present study demonstrated a chemotaxonomic relationship of the Ranunculaceae to the Papaveraceae and Rutaceae.

## EXPERIMENTAL

**PLANT MATERIAL.**—The plant material (cultivar: Tanba-ohren) was collected in May 1986, from the Botanical Garden of Gifu Pharmaceutical University, and a voucher specimen is kept in the Herbarium of Gifu Pharmaceutical University.

**EXTRACTION AND ISOLATION.**—Fresh seeds (7 kg) were percolated successively with *n*-hexane and MeOH. The MeOH solution was concentrated in vacuo, and the resultant residue was chromatographed on Si gel with C<sub>6</sub>H<sub>6</sub>-EtOAc (30:1). The eluate was rechromatographed on Si gel and sephadex LH-60. As a result of recrystallization, 6-acetonyl-5,6-dihydrosanguinarine (100 mg), sanguinarine (120 mg), norsanguinarine (45 mg), and oxysanguinarine (180 mg) were obtained. All compounds were identified by spectral data as well as by comparison to authentic samples.

## ACKNOWLEDGMENTS

The authors are grateful to Dr. M. Nishi, Setsunan University, for measurement of <sup>1</sup>H-nmr spectra (400 MHz), and to Dr. Y. Hashimoto, Dr. A. Kato, and Dr. M. Okada, Kobe Women's College of Pharmacy, for authentic samples of 6-acetonyl-5,6-dihydrosanguinarine, sanguinarine, norsanguinarine, and oxysanguinarine.

## LITERATURE CITED

1. A. Ikuta and H. Itokawa, *Sboyakugaku Zasshi*, **37**, 195 (1983).
2. A. Ikuta, A. Kobayashi, and H. Itokawa, *Sboyakugaku Zasshi*, **38**, 279 (1984).
3. B.D. Kane, M.O. Fagbule, M. Shamma, and B. Gozler, *J. Nat. Prod.*, **47**, 1 (1984).
4. T. Furuya and A. Ikuta, *Phytochemistry*, **11**, 3041 (1972).
5. W. Dopke, U. He, and U. Sagan, *Z. Chem.*, **16**, 54 (1976).
6. T. Gozler, M. Alionur, R.D. Minard, and M. Shamma, *J. Nat. Prod.*, **46**, 414 (1983).
7. P.G. Warterman and S.A. Khalid, *Biochem. Syst. Ecol.*, **9**, 45 (1981).
8. H. Itokawa, A. Ikuta, N. Tsutsui, and I. Ishiguro, *Phytochemistry*, **17**, 839 (1978).

Received 7 July 1986