ACKNOWLEDGMENTS

We would like to thank R.M. King for plant identification and F. Bohlmann for kindly providing high field nmr and mass spectra.

LITERATURE CITED

1. F.C. Hoehne, "Plantas e substancias vegetais toxicas e medicinais," Departamento de Botánica do Estado, Sao Paulo, 1978, p. 318.
2. G. Gallo, "Plantas tóxicas para el ganado en el cono sur de América," EUDEBA, Buenos Aires, 1979, p. 142-147.
3. L.A.C. Pieters and A.J. Vlietinck, *Fresenius Z. Anal. Chem.*, **321**, 355 (1985).
4. G. Schmeda Hirschmann and C. Céspedes, *J. Ethnopharmacol.*, **17**, 195 (1986).
5. R.J. Molyneux, A.E. Johnson, J.N. Roitman, and M.E. Benson, *J. Agric. Food Chem.*, **27**, 494 (1979).
6. H.J. Segall and J.L. Dallas, *Phytochemistry*, **22**, 1271 (1983).
7. J.S. Glasby, "Encyclopedia of the Alkaloids," Plenum Press, New York, 1975, pp. 744, 1173, 1360.

Received 5 August 1986

α- AND β-PELTATIN FROM *ERIOPE MACROSTACHYA*[1]

ROBERT F. RAFFAUF,* CHARLES J. KELLEY, YUSUF AHMAD, and PHILIP W. LE QUESNE*

Department of Chemistry and Section of Medicinal Chemistry, Northeastern University, Boston, Massachusetts 02115

Eriope macrostachya Mart. (Labiatae) is one of 28 species of the genus native to tropical and subtropical South America. It has no recorded reputation in the ethnobotanical literature as an anticancer drug (1). However, fractionation for antitumor constituents yielded a total extract showing strong cytotoxicity [ED_{50} 10^{-1} g/ml vs. KB and 3.1×10^{-2} vs. PS (P-388 lymphocytic leukemia)] according to standard National Cancer Institute protocols (2). A MeOH-H_2O (9:1)-soluble portion of the EtOH extract of the stems of the plant was chromatographed on Si gel to yield α- and β-peltatin, identified by mp, $[\alpha]_D$, ir, ^1H nmr, and tlc. These compounds are well-known cytotoxic constituents of *Podopohyllum peltatum* (3). To our knowledge, β-peltatin has been isolated from but one other member of the mint family, *Hyptis verticellata* (4).

The initial collection of plant material was made by Dr. Aparacio Pereira-Duarte (no. 12188) in the State of Minas Gerais, Brazil; the bulk collection was made and authenticated by the Economic Botany Laboratory, USDA, Beltsville, Maryland. Voucher specimens have been deposited in the herbaria of the Jardim Botanico, Rio de Janeiro, and Beltsville, respectively.

Full experimental details are available on request to either senior author.

ACKNOWLEDGMENTS

This study was supported by NCI Grant No. CA-13001-03/04, and by the Pakistan Council for Scientific and Industrial Research through a study grant to Y.A. We acknowledge also the assistance of Dr. Monroe E. Wall, Research Triangle Institute, Raleigh, North Carolina, for preliminary fractionation of the bulk collection.

[1]Part XIII in the series "Antitumor Plants." For part XII, see *J. Org. Chem.*, **47**, 1519 (1982). The use of the word *antitumor* in this title signifies no more than the fact that this plant has been deemed of sufficient interest in this respect by the National Cancer Institute to warrant investigation.

LITERATURE CITED

1. J.L. Hartwell, "Plants Used Against Cancer," Quarterman Publications Inc., Lawrence, MA, 1982.
2. R.I. Geran, N.H. Greenberg, M.M. MacDonald, A.M. Schumacher, and B.J. Abbott, *Cancer Chemother. Rep., Part 3*, **3**, 1 (1972).
3. I. Jardine, in: "Anticancer Agents Based on Natural Product Models." Ed. by J.M. Cassady and J.D. Douros, Academic Press, New York, 1980, pp. 319-351.
4. V.F. German, *J. Pharm. Sci.*, **60**, 649 (1971).

Received 22 September 1986

ASIMILOBINE AND LIRINIDINE, SEROTONERGIC RECEPTOR ANTAGONISTS, FROM *NELUMBO NUCIFERA*

NOBORU SHOJI,* AKEMI UMEYAMA, NOBUAKI SAITO, AKIO IUCHI, TSUNEMATSU TAKEMOTO

Department of Pharmacy, Tokushima-Bunri University, Tokushima-shi, Tokushima 770, Japan

AKIKO KAJIWARA, and YASUSHI OHIZUMI

Mitsubishi-Kasei Institute of Life Sciences, Machida-shi, Tokyo 194, Japan

Various parts of *Nelumbo nucifera* Gaertner (Nymphaeaceae) have been employed medicinally for a variety of indications in Oriental countries (1). Previous phytochemically-directed studies on the species have yielded numerous alkaloids (2-9). As part of our bioassay-directed studies on medicinal plants, we have isolated two serotonin antagonistic alkaloids from leaves of *N. nucifera*. This is the first report of the presence of asimilobine and lirinidine in *N. nucifera*. Both alkaloids inhibited the contraction of rabbit isolated aorta induced by serotonin (10^{-6}M). The pA_2 values of asimilobine and lirinidine are 5.78 and 7.36, respectively. Detailed pharmacological properties will be reported elsewhere.

EXPERIMENTAL

PLANT MATERIAL.—The dried leaves of *N. nucifera* were purchased from Nakaikoshindo, Ltd., Kobe, Japan, and a herbarium specimen of the plant material is being preserved in this laboratory.

EXTRACTION AND ISOLATION.—The leaves (5 kg) were exhaustively extracted with MeOH at room temperature. The concentrated extract was partitioned between H_2O and EtOAc. The aqueous layer was then extracted with *n*-BuOH. The *n*-BuOH extract was concentrated and the residue (404 g) adsorbed onto celite (600 g). After drying the resulting powder, the material was chromatographed over a Si gel (1.5 kg) column packed in $CHCl_3$, eluted with $CHCl_3$/MeOH mixtures of increasing polarity, and fractionated successively. Alkaloids were eluted with $CHCl_3$-MeOH (9:1). The crude alkaloid mixture was repeatedly subjected to column chromatography over Sephadex LH-20 with MeOH as the solvent and Si gel with NH_4OH-saturated $CHCl_3$ to afford asimilobine (75 mg) and lirinidine (110 mg), along with eight known alkaloids already isolated from the same species (nuciferine, nornuciferine, *N*-methylasimilobine, anonaine, roemerine, armepavine, *N*-norarmepavine, and liriodenine).

IDENTIFICATION DATA.—Each of the alkaloids was homogenous on tlc and spectroscopically pure but failed to crystallize. Data to identify asimilobine and lirindinine included $[\alpha]_D$, eims, uv, ir, ^1H nmr, and ^{13}C nmr. The nmr assignments were made on the basis of reported data of analogous compounds (10), together with ^1H-^1H and ^1H-^{13}C 2D correlation spectra. Their physical properties are in agreement with those published in the literature (10). This data is available upon request to the major author.

ACKNOWLEDGMENTS

The authers are very grateful to Miss A. Maeda and Miss N. Yamamoto of this department for their technical assistance.