

SAFROLE, THE MAIN COMPONENT OF THE ESSENTIAL OIL
FROM *PIPER AURITUM* OF PANAMA

MAHABIR P. GUPTA,* TOMÁS D. ARIAS,

Laboratorio Especializado de Análisis y Escuela de Farmacia, Universidad de Panama, Panamá

NORRIS H. WILLIAMS,

Department of Natural Sciences, The Florida State Museum, University of Florida, Gainesville, Florida 32611

R. BOS, and D.H.E. TATTJE

*Department of Pharmacognosy, University of Groningen, Ant. Deusinglan 2,
NL-9713 AW, Groningen, The Netherlands*

Piper auritum H.B.K. is commonly known in Panama as "Hinojo Sabalero." Its crushed leaves are used by the natives to catch fish during the dry season. Most of the fish thus caught have been identified as *Brycon chagrensis*, which is known as "Sábalo pipón." It is presumed, on the basis of field observations by Jolly (1), who described this local fishing technique, that the essential oil from the leaves acts as a fish attractant.

A chemical analysis of the essential oil obtained by steam distillation of the fresh leaves revealed the presence of safrole as the major component (ca. 70%). Its identity was confirmed by comparing its retention times on two different columns against an authentic sample of safrole with the sample for gc analysis on two different columns, ir, ^1H nmr and gc/ms.

The minor components were tentatively identified by comparison of their mass spectra and retention times with library searches. For this, the oil was fractionated by column chromatography before submitting it to gc.

Besides safrole, about 40 other constituents in minor quantities were identified: α -thujene, α -pinene, camphene, sabinene, β -pinene, myrcene, α -phellandrene, Δ^3 -carene, α -terpinene, limonene, 1,8-cineole, γ -terpinene, β -phellandrene, *cis*-sabinene hydrate, nonanone-2, *p*-cymene, terpinolene, linalool, camphor, borneol, *p*-cymen-8-ol, bornyl acetate, eugenol, Δ -elemene, α -cubenene, muurolene, α -copaene, β -bourbonene, a paraffin, β -caryophyllene, humulene, myristicine, β -bisabolene, elemicine, Δ -cadinene, cadina-1,4-diene, spathulenol, β -caryophyllene oxide, *n*-hexadecane, and a spathulenol isomer.

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded with the following instruments: ir, Perkin Elmer 577; ^1H nmr, Bruker HX-270 MHz; ms, Finnigan 3000 quadrupole with a computerized system.

PLANT MATERIALS.—The leaves of *P. auritum* were collected in March of 1980 in Boca de Uracillo, an isolated village located in the Province of Colon, Republic of Panama. The taxonomic identity of the plant was established by Prof. Mireya Correa, Curator of Herbarium at the University of Panama, where a voucher is deposited (Voucher No. 976).

EXTRACTION AND IDENTIFICATION.—The steam distillate from fresh leaves was extracted with Et_2O . The Et_2O extract was dried over Na_2SO_4 , filtered, and evaporated in vacuo with a rotary evaporator. A pale yellowish clear liquid was obtained (yield: 0.71%, refractive index 1.5012 to 1.5343).

The essential oil was diluted with pentane and chromatographed on two different columns and a dual FID gas chromatograph. For gc/ms, 7 g of the oil were chromatographed on a silica gel column using petroleum ether (b.p. $<40^\circ$) containing increasing amounts of Et_2O (0-100%). These fractions were collected and stored at -20° until analyzed by gc/ms.

Full details of the isolation and identification of safrole are available on request to the senior author.

ACKNOWLEDGMENTS

The authors wish to acknowledge the financial support of the Organization of American States for sponsoring the research project entitled "Pharmacognostic Study of Panamanian Flora," the Alexander Von Humboldt Stiftung for equipment donation to one of us (MPG), and an International Foundation for Science Research grant (R 396) to one of us (MPG). Thanks are also due to Professor Mireya Correa for the taxonomic identity of the plant, and to Mr. and Mrs. Antonio Soto and Mr. Ismael Hidalgo for their technical assistance during the initial phase of the work.

LITERATURE CITED

1. J.G. Jolly, *Econ. Bot.*, **35**, 383 (1981).