

Phytochemical screening of Costa Rican plants: Alkaloid analysis. IV*

by

José A. Sáenz R.** and Maryssia Nassar C.**

(Received for publication June 10, 1970)

We have followed in this report the same criteria of previous papers (1, 2, 3).

MATERIAL AND METHODS

Roots, leaves, and stems of Costa Rican plants were used, processed and analyzed following procedures already described (1, 2, 3). Herbarium vouchers of each species studied were prepared and placed in the Herbarium of the Dept. of Biology of the University of Costa Rica.

RESULTS

A summary of the results is detailed in Table 1.

* This work has been supported by Research Contract PH 43-64-31 of the National Institutes of Health of the U.S.A.

** Departamento de Biología, Universidad de Costa Rica.

TABLE 1

Qualitative alkaloid analysis

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H ⁺ Layer	OH ⁻ Layer
ACANTHACEAE					
<i>Dicliptera unguiculata</i> Nees.	Sornia, Olotillo	San Pedro	Leaves & Stem	—	—
ACTINIDIACEAE					
<i>Saurauia costaricensis</i> Donn. Sm.	Moco	C. Panam.	Leaves	—	—
			Stem	—	—
AMARANTHACEAE					
<i>Alternanthera amoena</i> Rigel.		Tárcoles	Leaves & Stem	+ (w)	+
<i>Iresine Celosia</i> L.	Camarón	San Pedro	Leaves & Stem	—	—
ANACARDIACEAE					
<i>Anacardium excelsum</i> (Bert. & Balb.) Skeels.	Espavé	Guanacaste	Leaves	—	—
			Stem	—	—
<i>Spondias mombin</i> L.	Jobo	Esterillos	Leaves	—	—
			Stem	—	—
ANNONACEAE					
<i>Sapranthus palanga</i> Fries.	Palanco	La Garita	Leaves	—	—
			Stem	—	—
<i>Xylopia sericophylla</i> Standl.	Manga larga	San Carlos	Leaves	+ +	—
			Stem	+	—

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H ⁺ Layer	OH ⁻ Layer
APOCYNACEAE					
<i>Mandevilla subsagittata</i> (R & P) Woodson		V. de Jorco	Leaves & Stem	—	—
<i>Thevetia ovata</i> (Cav.) A.DC.	Chirca venenosa	Guanacaste	Leaves	—	+
			Stem	—	+
AQUIFOLIACEAE					
<i>Ilex lamprophylla</i> Standl.		V. Irazú	Leaves	—	—
			Stem	—	—
BIGNONIACEAE					
<i>Pseudocalymma macrocarpum</i> (D.S.) Sdw.	Hosmeca, Jumecca	Guanacaste	Leaves	—	+
			Stem	—	—
BORAGINACEAE					
<i>Cordia alliodora</i> (R & P) Cham	Laurel	Guanacaste	Leaves	—	—
			Stem	—	—
<i>Tournefortia bicolor</i> Swartz.		Tárcoles	Leaves & Stem	—	—
BRASSICACEAE					
<i>Lepidium costaricense</i> Thell.	Mastuerzo	San José	Whole plant	—	—
CAESALPINIACEAE					
<i>Baubinia pauletia</i> Pers.	Pie de venado	Guanacaste	Leaves	+	(w) —
			Stem	—	—
<i>Peltogyne purpurea</i> Pittier	Nazareno	Palmar Sur	Leaves	—	—
			Bark	—	—
			Pith	—	—

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H ⁺ Layer	OH ⁻ Layer
COMBRETACEAE					
<i>Terminalia catappa</i> L.	Almendro	Limón	Leaves Stem	— —	— —
COMPOSITAE					
<i>Calea urticifolia</i> (Mill.) DC.	Jalacate, Jaral	Orosi	Leaves Stem	+ (w) —	— —
<i>Calyptracarpus vialis</i> Less.	Espinillo	San José	Leaves & Stem	—	—
CUCURBITACEAE					
<i>Luffa cylindrica</i> (L.) Roem	Paste, Estopa	Liberia	Leaves & Stem	—	—
EUPHORBIACEAE					
<i>Jatropha tubulosa</i> Muell.	Yerba santa	Palmar Norte	Leaves Stem	— —	+ (w) —
<i>Mabea montana</i> Muell.		S. Isidro Grañ.	Leaves Stem	— —	— —
FAGACEAE					
<i>Quercus citrifolia</i> Liebm.	Encino	V. Irazú	Leaves Stem	— —	— —
<i>Quercus irazuensis</i> Ktze.	Roble	V. Irazú	Leaves Stem	— —	— —
GUTTIFERAE					
<i>Clusia odorata</i> Seem	Azahar de monte	San Carlos	Leaves Stem	— —	— —
<i>Symphonia globulifera</i> L.f.	Cerillo, Botoncillo	Esterillos	Leaves Stem	— —	— —

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H+Layer	OH Layer
HYDROPHYLLACEAE					
<i>Wigandia caracasana</i> HBK	Ortiga de montaña	Curridabat	Leaves	—	—
			Stem	—	—
LAURACEAE					
<i>Ocotea veraguensis</i> (Meissn.) Mez.	Canelo, Canelillo	Guanacaste	Leaves	+	—
			Stem	—	—
<i>Phoebe Pittieri</i> Mez.	Aguacatillo	V. Irazú	Leaves	++	—
			Stem	++	—
LOBELIACEAE					
<i>Isotoma longiflora</i> (L.) Presl.	Jazmín de Estrella, Jazmincillo	San Carlos	Leaves & Stem	++	++
MELASTOMACEAE					
<i>Miconia dodecandra</i> Cogn.	Santa María	C. Panam.	Leaves	—	—
			Stem	—	—
MIMOSACEAE					
<i>Acacia tenuifolia</i> (L.) Willd.		La Garita	Leaves	—	—
			Stem	—	—
<i>Enterolobium cyclocarpum</i> (Jacq.) Griseb.	Guanacaste	La Garita	Fruit	—	—
<i>Pithecellobium dulce</i> (Rox.) Benth.	Michigüiste	Guanacaste	Leaves	—	—
			Stem	—	—
MONIMIACEAE					
<i>Siparuna griseo-flavescens</i> Perk.	Limoncillo	S. Isidro Gra.	Leaves	++	—
			Stem	++	—

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H ⁺ Layer	OH ⁻ Layer
MORACEAE					
<i>Brosimum utile</i> (HBK) Pitt.	Mastate	Golfito	Bark	—	—
MYRISTICACEAE					
<i>Compsonera sprucei</i> (A.DC.) Warb.	Cerezo, Sangre	Golfito	Fruit	—	—
			Leaves	—	—
			Stem	—	—
MYRSINACEAE					
<i>Stylogyne ramiflora</i> (Oerst.) Mez.	Guastomate	Liberia	Leaves	—	—
			Stem	—	—
MYRTACEAE					
<i>Eugenia cartagensis</i> Berg	Turrú, Murta, Guayabillo	Puriscal	Leaves	—	—
			Stem	—	—
PAPILIONACEAE					
<i>Canavalia maritima</i> (Aubl.) Th.	Frijol de playa	Tamarindo	Leaves & Stem	—	—
<i>Lonchocarpus latifolius</i> (Willd.) HBK.	Chaperno	Golfito	Leaves	—	—
			Stem	—	—
<i>Lonchocarpus sericeus</i> v. <i>glabrescens</i> Benth.	Chaperno	Guanacaste	Leaves	—	—
			Stem	—	—
<i>Pterocarpus Hayesii</i> Hemsl.	Sangre de Drago	San Carlos	Leaves	—	—
			Stem	—	—
POLYGONACEAE					
<i>Coccoloba caracasana</i> Meissn.	Papaturro blanco	Guanacaste	Leaves	—	—
			Stem	—	—
<i>Muehlenbeckia platyclada</i> Meissn.	Solitaria	Naranjo	Leaves & Stem	+	+ (w)
<i>Rumex acetosella</i> L.	Ruibarbillo	V. Irazú	Leaves & Stem	—	—

Species	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H ⁺ Layer	OH ⁻ Layer
ROSACEAE					
<i>Holodiscus argenteus</i> (L.F.) Max.		V. Irazú	Leaves	—	—
			Stem	—	—
RUBIACEAE					
<i>Cinchona pubescens</i> Vahl	Quina	Esterillos	Leaves	+++	+(v.w)
			Stem	++	+(v.w)
<i>Cibomelia spinosa</i> Jacq.	Malacahuite	Tamarindo	Leaves	—	—
			Stem	—	—
<i>Gomozia granadensis</i> L.		C. de la Muerte	Whole plant	—	—
<i>Ixora coccinea</i> L.	Jazmín	Golfito	Leaves & Stem	—	—
RUTACEAE					
<i>Zanthoxylum limoncello</i> Pl. & Oerst.	Limoncillo, Zorrillo	San José	Leaves	—	+
			Stem	—	+(w)
SAPINDACEAE					
<i>Blighia sapida</i> Koenig	Seso vegetal	Portete	Leaves	—	—
			Stem	—	—
			Fruit	—	—
SAPOTACEAE					
<i>Cbrysophyllum panamense</i> Pitt.		Esterillos	Leaves	—	—
			Stem	—	—
SAXIFRAGACEAE					
<i>Hydrangea opuloides</i> Koch.	Hortensia	Los Cartagos	Leaves & Stem	+	+(w)

	Folk name	Locality	Plant Part	Alkaloid H ⁺ Layer	Analysis OH ⁻ Layer
SIMARUBACEAE					
<u><i>Quassia amara</i> L.</u>	<u>Hombre grande</u>	<u>Pérez Zeledón</u>	Leaves	+ (v.w)	—
			Stem	+ (w)	+
<u><i>Simaruba glauca</i> DC.</u>	<u>Olivo, Aceituno</u>	<u>Liberia</u>	Leaves	+ (w)	—
			Stem	—	—
STERCULIACEAE					
<u><i>Helicteres guazumaefolia</i> HBK.</u>	<u>Rabo de puerco</u>	<u>Guanacaste</u>	Leaves	+	—
			Stem	—	—
<u><i>Herrania purpurea</i> (Pitt.) R.E. Sch.</u>	<u>Caca● de monte</u>	<u>Golfito</u>	Leaves	—	—
			Stem	—	—
TEOPHRASTACEAE					
<u><i>Jacquinia macrocarpa</i> Cav.</u>	<u>Burriquita</u>	<u>Liberia</u>	Leaves	—	—
			Stem	—	—
TILIACEAE					
<u><i>Apeiba tibourbou</i> Aubl.</u>	<u>Peine de mico</u>	<u>Villa Neily</u>	Leaves	—	—
			Stem	—	—
<u><i>Luebea Seemannii</i> Tr. & Pl.</u>	<u>Guácimo macho</u>	<u>Villa Neily</u>	Leaves	—	—
			Stem	—	—
VERBENACEAE					
<u><i>Avicennia nitida</i> Jacq.</u>	<u>Palo de sal</u>	<u>Guanacaste</u>	Leaves	—	—
			Stem	—	—
<u><i>Citbarexylum viride</i> Mold.</u>	<u>Corrimiento</u>	<u>Villa Neily</u>	Leaves	—	—
			Stem	—	—
			Fruit	—	—

	Folk name	Locality	Plant Part	Alkaloid Analysis	
				H+Layer	OH Layer
<i>Cornus grandifolia</i> (Schlecht. & Cham.) Sch.	Pavilla, Murciélago	Tapantí	Leaves	—	—
			Stem	—	—
<i>Lippia Torresii</i> Standl.	Caragra	El Empalme	Leaves	—	—
			Stem	—	—
<i>Vitex Cooperi</i> Standl.	Cuajada	Quepos	Leaves	+(w)	—
			Stem	—	+(w)
VOCHYSIACEAE					
<i>Vochysia ferruginea</i> Mart.	Mayo, Mayo colorado	S. Isidro Gral.	Leaves	—	—
			Stem	—	—
ALGAE					
CAULERPACEAE					
<i>Caulerpa racemosa</i> var. <i>uvifera</i>		Limón	Whole plant	—	—
<i>Caulerpa sertularioides</i> (Gm.) Howe		Limón	Whole plant	—	—
CODIACEAE					
<i>Codium isthmocladum</i>		Limón	Whole plant	—	—

DISCUSSION

From the comparison of the above results with those published by the U.S.D.A. (4) and with later reports, it appears that the qualitative alkaloid analysis of the following plants is reported for the first time: *Alternanthera amoena* Rigel, leaves and stem; *Xylopia sericophylla* Standl., leaves and stem; *Thevetia ovata* (Cav.) A. DC., leaves and stem; *Pseudocalymma macrocarpum* (D.S.) Sdw., leaves; *Bauhinia pauletia* Pers., leaves; *Galea urticifolia* (Mill.) DC., leaves; *Jatropha tubulosa* Muell., leaves; *Ocotea veraguensis* (Meissn.) Mez, leaves; *Phoebe Pittieri* Mez, leaves and stem; *Siparuna griseo-flavescens* Perk., leaves and stem; *Muehlenbeckia platyclada* Meissn., leaves and stem; *Zanthoxylum Limoncello* Pl. & Oerst., leaves and stem; *Simaruba glauca* DC., leaves; *Helicteres guazumaefolia* HBK, leaves; *Vitex Cooperi* Standl., leaves and stem.

ACKNOWLEDGMENT

We thank Dr. Luis A. Fournier for his valuable assistance in the identification of most plants here reported.

SUMMARY

A total of 72 species of Costa Rican plants were tested for their alkaloid content in both acid and alkaline layers; 16 of them are reported for the first time as containing alkaloids.

RESUMEN

Se analizó por alcaloides, tanto en la capa ácida (alcaloides terciarios) como en la alcalina (alcaloides cuaternarios), un total de 72 especies de plantas de Costa Rica. Se comunica por primera vez el análisis cualitativo positivo de 16 de las especies mencionadas en este trabajo.

LITERATURE CITED

1. SÁENZ, J. A.
1964. Contribución al estudio fitoquímico de plantas costarricenses. I. Análisis alcaloidal. *Rev. Biol. Trop.*, 12: 67-74.
2. SÁENZ, J. A. & MARYSSIA NASSAR
1965. Phytochemical screening of Costa Rican plants: Alkaloid analysis. II. *Rev. Biol. Trop.*, 13: 207-212.
3. SÁENZ, J. A. & MARYSSIA NASSAR
1968. Phytochemical screening of Costa Rican plants: Alkaloid analysis. III *Rev. Biol. Trop.*, 15: 195-202.
4. WILLAMAN, J. J., ed.
1961. *Alkaloid-bearing plants and their contained alkaloids*. Washington, D. C., U. S. Dept. of Agriculture, Tech. Bull. No. 1234, 287 pp.