A SURVEY OF PLANTS IN GUJARAT, INDIA, FOR ALKALOIDS, SAPONINS, AND TANNINS

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A SURVEY OF PLANTS IN GUJARAT, INDIA, FOR ALKALOIDS, SAPONINS, AND TANNINS

A FLORISTIC and phytochemical survey of forests in Gujarat State, India, is being undertaken to identify sources of alkaloids, saponins, and tannins. This note is a report on the results of screening 105 plant species collected from that region.

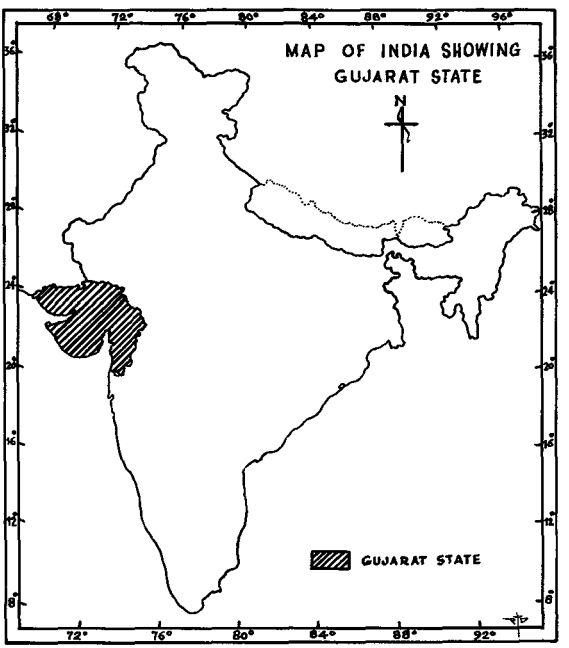
Methods

Plants were collected from forest regions of Gujarat State. The plant parts were air-dried and then separated and dried to a constant weight at 60°C.

About 5 gms. of the dry crushed plant material were divided into two parts. One part was treated with liquor ammonia for 40 to 60 minutes and then extracted in ethanol for 48 hours at 30°C. The ethanol extract was distilled under vacuum, transferred to a china clay dish, and evaporated to dryness. The dried extract was treated with dilute H_2SO_4. The acid extract was centrifuged and tested for alkaloids with Dragendroff's *(4)* and Mayers and Wagners *(1)* reagents.

The other portion of the plant material was extracted in boiled water. After cooling, half of the extract was shaken vigorously to froth and then was allowed to stand for 15 to 20 minutes and was classified for saponin contents. (No froth = negative; froth less than 1 cm. high = weakly positive; froth 1 cm. to 2 cm. high = positive; and froth greater than 2 cm. high = strongly positive *(2).*) Only the materials classed as positive or strongly positive were considered in the study.

The water extract was also used for screening with gelatin salt solution and iron alum reagents *(3)* to test for presence of tannins.



Results

Of the 105 plant species tested, 86 were found to be alkaloid-bearing, 34 showed presence of saponins, and 44 showed presence of tannins (table 1).

Table 1.—*Summary results of 105 plant species tested for presence of alkaloids, saponins, and tannins*

[+ indicates positive reaction]

Plant parts are abbreviated as follows: B = bark, F = flowers, Fr = fruit, FrW = fruit wall, Inf = inflorescence, L = leaves, P = pods, R = roots, S = stem, Sd = seeds, SP = small plant, YB = young branch.

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
	DILLENIACEAE				
1.	*Dillenia pentagyna* Roxb.	S	—	—	+
		L	—	—	—
	ANONACEAE				
2.	*Miliusa tomentosa* (Roxb.) Sinclair	S	+	—	+
		L	+	—	+
		Fr	+	+	+
	MENISPERMACEAE				
3.	*Cissampelos pareira* Linn.	S	+	—	—
		L	+	—	—
4.	*Cocculus hirsutus* (Linn.) Diels.	S	+	—	—
		L	+	—	—
5.	*Tinospora cordifolia* Miers.	S	+	—	—
		R	+	—	—
	PAPAVERACEAE				
6.	*Argemone mexicana* Linn.	S	+	—	—
		L	+	—	—
		R	+	—	—
	CAPPARIDACEAE				
7.	*Cleome simplicifolia* H.f. & T.	S	+	—	+
		L	+	—	+
8.	*Crataeva nurvala* Buch.-Ham.	S	+	—	—
		L	+	—	—
	TAMARICACEAE				
9.	*Tamarix ericoides* Rottl.	YB	—	—	+
		F	—	—	+
	BOMBACACEAE				
10.	*Adansonia digitata* Linn.	Fr	+	+	—
		Sd	—	+	—
11.	*Bombax ceiba* Linn.	L	+	—	—
	STERCULIACEAE				
12.	*Sterculia foetida* Linn.	Fr	—	—	+
13.	*Sterculia urens* Roxb.	FrW	+	—	—
		B	—	—	—
	TILIACEAE				
14.	*Corchorus olitorius* Linn.	S	+	+	—
		L	+	+	—
		Fr	+	+	—

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
15.	*Corchorus trilocularis* Linn.	S	+	+	—
		L	+	+	—
		Fr	—	+	—
	MALPIGHIACEAE				
16.	*Hiptage benghalensis* (L.) Kurz.	S	—	+	—
		L	—	+	+
		F	—	+	+
	OXALIDACEAE				
17.	*Biophytum sensitium* (Linn.) DC.	SP	+	—	—
	BURSERACEAE				
18	*Boswellia serrata* Roxb.	S	—	—	+
		B	—	—	+
	CELASTRACEAE				
19.	*Celastrus panticulatus* Willd.	L	—	—	—
		Fr	—	—	—
20.	*Maytenus emarginatus* (Willd.) Ding Hou	S	—	—	+
		L	+	—	+
		F	—	+	—
	SAPINDACEAE				
21.	*Cardiospermum halicacabum* Linn.	S	+	—	—
		L	+	—	—
		Sd	+	—	—
22.	*Sapindus emarginatus* Vahl	S	—	+	—
		L	—	+	+
	PAPILIONACEAE				
23.	*Clitoria biflora* Dalz.	S	—	+	—
		L	+	+	—
24.	*Crotalaria retusa* Linn.	S	+	+	—
		L	+	—	—
		Fr	+	+	—
25.	*Dalbergia latifolia* Roxb.	Fr	+	—	+
26.	*Dalbergia sisso* Roxb.	S	+	—	—
		L	+	—	—
		Fr	+	—	—
27.	*Indigofera oblongifolia* Forsk.	S	+	+	—
		L	+	+	—
28.	*Pongamia pinnata* (L.) Pierre	B	—	—	—
29.	*Pterocarpus marsupium* Roxb.	B	—	+	+
		L	—	+	—
		FrW	+	—	—
		Sd	+	—	—
30.	*Tephrosia hamiltonii* J. R. Drumm.	S	+	—	—
		R	+	+	+

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
	CAESALPINIACEAE				
31.	*Cassia auriculata* Linn.	S	—	—	+
		L	—	—	+
		F	—	—	+
		Fr.	—	—	+
32.	*Cassia fistula* Linn.	Sd	—	+	—
		FrW	+	+	+
33.	*Cassia italica* (Mill.) Lamk.	S	+	—	—
		L	+	—	—
		F	+	—	—
		Fr	+	—	—
34.	*Cassia occidentalis* Linn.	S	+	+	+
		L	+	—	—
		R	+	+	—
35.	*Cassia sophera* Linn.	S	+	—	—
		L	+	—	—
36.	*Caesalpinia crista* Linn.	Fr	+	—	+
37.	*Parkinsonia aculeata* Linn.	S	+	+	—
		L	+	—	—
		F	+	—	—
		Sd	+	—	—
		P	+	+	+
	MIMOSACEAE				
38.	*Acacia chundra* (Roxb.) Willd.	Sd	—	+	—
39.	*Acacia intsia* Willd.	S	—	—	+
		P	—	—	+
		Sr	+	—	—
40.	*Acacia pennata* Willd.	P	+	—	+
41.	*Albizzia procera* (Roxb.) Benth.	L	—	—	+
		P	—	—	+
42.	*Prosopis spicigera* Linn.	S	+	+	+
		L	+	+	+
		Fr	—	+	+
	COMBRETACEAE				
43.	*Anogeissus latifolia* Wall. ex Beddome	S	—	—	+
		L	—	—	+
		Fr	+	—	+
44.	*Anogeissus pendula* Edgew.	S	+	—	+
		L	+	—	+
		Fr	+	—	+
45.	*Calycopteria floribunda* Lam.	S	—	—	+
		L	+	—	+
		F	—	+	—

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
46.	*Combretum ovalifolium* Roxb.	Fr	+	—	+
47.	*Terminalia arjuna* (Roxb. ex DC.) Wt. & Arn.	Fr	—	—	+
48.	*Terminalia bellirica* (Gaertan.) Roxb.	Fr	+	—	+
49.	*Terminalia crenulata* Roth.	Fr	+	—	+
	LYTHRACEAE				
50.	*Lagerstroemia lanceolata* Roxb.	S	+	—	+
		B	+	—	+
		Fr	—	—	—
51.	*Woodfordia fruticosa* (L.) Kurz	S	—	+	+
		L	—	+	+
		F	+	+	+
	FICOIDACEAE				
52.	*Sesunium portulacastrum* Linn.	S	+	+	+
		L	+	+	+
53.	*Trianthema hydaspica* Edgew.	S	+	—	—
		L	+	—	—
		F	+	—	—
	UMBELLIFERAE				
54.	*Pimpinella adscendens* Dalz.	S	—	—	—
		Fr	+	—	—
	RUBIACEAE				
55.	*Adina cordifolia* Hook. f.	S	+	+	+
		F	—	—	+
		Fr	+	—	+
56.	*Borreria articularis* (L.f.) F.N. Will	S	—	—	+
		L	—	—	+
		R	—	—	—
57.	*Morinda tomentosa* Heyne ex Roth.	S	+	—	—
		L	+	+	—
	COMPOSITAE				
58.	*Cyathocline purpurea* (Don.) O. Kuntze	S	+	—	+
		L	+	—	+
		F	+	—	+
59.	*Elephantopus scaber* Linn.	S	—	+	—
		R	+	—	—
	PLUMBAGINACEAE				
60.	*Plumbago zeylanica* Linn.	S	+	—	+
61.	*Vogelia indica* Gibs.	S	+	—	+
		L	+	—	+
	APOCYNACEAE				
62.	*Holarrhena antidysentierica* Wall.	L	+	—	+

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
63.	*Rauwolfia tetraphylla* Linn.	S	+	—	—
		L	+	—	—
		Sd	+	—	—
	ASCLEPIADACEAE				
64.	*Hemidesmus indicus* R. Br.	S	+	—	—
		L	—	—	+
		R	+	—	—
	GENTIANACEAE				
65.	*Canscora diffusa* R. Br.	S	—	—	—
		L	+	—	—
66.	*Enicostemma hyssopifolium* (Willd.) Verd.	S	+	—	—
		L	+	—	—
	BORAGINACEAE				
67.	*Heliotropium scabrum* Retz.	S	+	—	—
		L	+	+	—
		F	+	+	—
	CONVOLVULACEAE				
68.	*Convolvulus microphyllus* Sieb.ex Spreng	S	+	—	—
		L	+	—	—
		F	+	—	—
69.	*Cressa cretica* Linn.	S	+	—	—
		L	—	—	—
70.	*Evolvulus alsinoides* Linn.	S	+	—	—
		L	+	—	—
		R	+	—	—
71.	*Ipomea digitata* Linn.	S	+	—	—
		L	+	—	—
		F	+	—	—
72.	*Merremia tridentata* (Linn.) Hall. f.	S	+	—	+
	SOLANACEAE				
73.	*Withania somnifera* (L.) Dunal	S	+	—	—
		L	+	—	—
		R	+	—	—
	SCROPHULARIACEAE				
74.	*Lindenbergia muraria* (Rob.) P. Bruehl.	L	—	+	—
		F	—	+	—
	BIGNONIACEAE				
75.	*Oroxylum indicum* Vent.	B	—	—	—
		L	+	—	—
		Sd	+	+	—
		P	+	+	—
76.	*Tecomella undulata* Seem.	S	+	+	—
		L	+	+	—

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
	ACANTHACEAE				
77.	*Adhatoda vasica* Nees	S	+	—	—
		L	+	—	—
		F	+	—	—
78.	*Andrographis echioides* Nees	S	+	—	—
		L	+	—	—
79.	*Barleria prionitis* Linn.	S	+	—	—
		L	+	—	—
80.	*Bremekampia verticillata* (Roxb.) Sreem.	S	+	—	—
		L	+	—	—
		F	+	—	—
81.	*Elytraria acaulis* (Linn.) Linades	L	+	—	—
		F	+	+	—
82.	*Eranthemum rosaeum* (Vahl) R. Br.	S	—	—	—
		R	+	+	—
83.	*Ruellia tuberosa* L.	S	—	—	—
		L	—	—	—
	VERBENACEAE				
84.	*Clerodendron phlomidis* Linn. f.	S	+	—	—
		L	+	—	—
		F	+	—	—
85.	*Nyctanthes arbor-tristis* Linn.	S	+	—	—
		L	+	+	—
		P	+	—	—
86.	*Tectona grandis* Linn.	S	+	—	—
87.	*Vitex negundo* Linn.	L	—	—	—
	LABIATAE				
88.	*Anisomeles indica* (Linn.) O. Kuntze	S	+	—	—
		L	+	—	—
		F	+	—	—
		Inf	+	—	—
	NYCTAGINACEAE				
89.	*Boerhavia diffusa* Linn.	S	+	—	—
		L	+	—	—
		R	+	—	—
	AMARANTHACEAE				
90.	*Achyranthes aspera* Linn.	S	+	—	—
	var. *porphyristachya* Hook f.	L	+	—	—
		R	+	—	—
		Sd	+	+	—

CONTINUED

Table 1.—Continued

No.	Plant name	Plant parts	Test for — Alkaloids	Saponins	Tannins
	LORANTHACEAE				
91.	*Dendrophthoe falcata* (L.f.) Ettings	S	—	+	+
		L	+	—	+
		F	—	—	+
92.	*Viscum nepalense* Spreng.	S	+	—	—
		Fr	—	—	—
	EUPHORBIACEAE				
93.	*Baliospermum montanum* (Willd.) Muell.	S	+	—	—
		L	+	—	—
		R	+	—	—
		Fr	+	+	—
94.	*Bridelia squamosa* (Mueel. Arg.) Germ.	L	+	—	—
95.	*Dalechampia scandens* Linn.	S	—	+	—
	var. *cordofana* (Hochst.) Muell. Arg.	L	+	+	+
96.	*Emblica officinalis* Gaertn.	L	—	—	+
	ULMACEAE				
97.	*Trema orientalis* (Linn.) Blume	S	+	—	—
		L	+	—	—
	URTICACEAE				
98.	*Ficus bengalensis* Linn.	S	—	—	+
		L	+	—	—
		Fr	—	—	+
	MUSACEAE				
99.	*Musa rosacea* Jacq.	Inf	—	—	+
	DIOSCOREACEAE				
100.	*Dioscorea bulbifera* Linn.	S	+	—	—
		Fr	+	—	—
	LILIACEAE				
101.	*Asparagus racemosus* Willd. var. *javanica* Baker	R	+	—	—
102.	*Chlorophytum tuberosum* Baker	R	—	—	—
103.	*Gloriosa superba* Linn.	S	—	—	—
		L	+	—	—
	GRAMINEAE				
104.	*Cymbopogon martinii* (Roxb.) Wats	S	+	—	—
	POLYPODIACEAE				
105.	*Actiniopteris australis* (L.f.) Link.	L	+	—	—
		R	+	—	—

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