A PHYTOCHEMICAL SURVEY OF SOME OF THE PLANTS OF NORTH WESTERN PART OF WEST PAKISTAN

M. IKRAM AND M. ISLAM

Indigenous Drug Research Division, Pakistan Council of Scientific and Industrial Research, Peshawar

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West Pakistan, because of its varied soil and climatic conditions, is very rich in plants belonging to different species most of which are used medicinally. The frontier region is specially well-known for its wealth of medicinal plants. The present work was taken in hand to systematically screen the plants of this region for their alkaloidal content. Most of the plants investigated are reported to have medicinal properties.

The plant material was carefully dried in the shade and the alkaloidal content estimated gravimetrically. The alkaloidal constitutents of some of the plants were separated by paper chromatography and their R_f values reported.

The following general procedure was adopted for the assay:—

Finely powdered dry material (15 g.) was mixed thoroughly with aqueous ammonia (2N, 15 ml.) and packed in a Soxhlet extractor fitted with a flask of 150 ml. capacity. The extraction was carried out for six hours, using chloroform as the solvent. The extract was concentrated under reduced pressure at 50-70°C. The solvent-free residue was rubbed with hydrochloric acid (2N, 6 ml.). The acid extract was carefully filtered and along with the washings taken in a weighed evaporating dish and dried on the water-bath and finally to constant weight in a vacuum dessicator over phosphorous pentoxide. The alkaloidal content was calculated on the basis of the weight of the dry residue.

TABLE 1.—TOTAL ALKALOIDS (ON DRY WEIGHT BASIS) AND THEIR R_f. VALUES (PAPER CHROMATOGRAPHY) OF THE PLANTS SCREENED FOR ALKOLOIDS.

	Name of the plant*	Alkaloid %	R_f values †
1.	*Apocynaceae*		
	Nerium odorum (t)	1.56	—
	,, ,, (l)	1.79	—
	,, ,, (fl)	1.46	—
2.	*Araceae*		
	Arisaema wellichianum (r)	0.25	(0.91) (A ‡)
	,, jacquemontii (r)	0.22	(0.71) (A ‡)
	,, ,, ,, (fr)	—	—
3.	*Asclepiadaceae*		
	Calatropis procera (l)	0.17	(0.88) (B ‡)
4.	*Amaranthaceae*		
	Achyranthes aspera (st)	nil	—
	,, ,, (l)	nil	—
5.	*Berberidaceae*		
	Berberis lycium (t & l)	0.12	—
	,, ,, (fr)	0.46	—
6.	*Baraginaceae*		
	Onosma echioides (fl)	0.13	(0.70) (AO
	Lithapermum officinale (wp)	nil	—
	Heliotropium indicum (wp)	1.04	(0.83) D ‡)
7.	*Chenopodiaceae*		
	Chenopodium ambrosioides	0.26	(0.68) (AO)
8.	*Compositae*		
	Sonchus arvensis (wp)	0.18	(0.67) (AO)
	Launaea nudicaulis (wp)	nil	
	Calendula arvensis (fl)	0.1	(0.42) (AO)
	Calendula officinalis (fl)	nil	
	Centaurea phyllocephylla (wp)	0.33	—
	Cichorium intybus (wp)	0.12	0.89 (AO)
	Achillea millefolium (wp)	0.18	0.83 (A‡)
	Xanthium strumarium (st)	0.17	—
	,, ,, (l)	0.25	(i) 0.42 (AO) (ii) 0.70
	Anthemis cotula (fl)	0.18	(i) 0.35 (AO) (ii) 0.68
	Anthemis cotula (l)	0.12	(i) 0.23 (AO) (ii) 0.67
9.	*Cruciefrae*		
	Sisymbrium irio (wp)	0.11	(i) 0.67 (AO)
	Lepidium draba (t & l)	0.2	(i) 0.71 (ii) 0.79 (D‡) (iii) 0.93
	Capsella bursa-pastoris (wp)	0.12	0.73 (AO)
10.	*Cucurbitaceae*		
	Momordica dioca (wp)	nil	
	,, ,, (r)	nil	
	Citrullus colocynthis (fr)	nil	

* Plant parts are in parenthesis : l, leaves; b, bark; r, root; fl, fllower ; fr, fruit ; wp, whole plant less root; st, stem; t, twigs.

† Elution of chromatogram takes on an average 2-1/2 hours in case of circular chromatography and 12 hours in case of descending chromatography. Whatman paper No. 1 was used in all the experiments.

Solvents: A. *n*-Butanol: acetic acid glacial: water (40:10:20). B. *n*-Butanol: acetic acid glacial = 100:10, saturated with water. C. *n*-Butanol: hydrochloric acid conc. = 100:22, saturated with water. D. *n*-Butanol: acetic acid glacial: water (6:1:3).

‡, descending; O ,circular.

TABLE 1.—(contd.)

Name of the plant*	Alkaloid %	R_f values †
11. *Equisetaceae*		
Equisetum debile (wp)	nil	
12. *Euphorbiaceae*		
Euphorbia royleana (wp)	nil	
13. *Hypericaceae*		
Hypericum perforatum (wp)	0.18	0.64 (A‡)
14. *Iridaceae*		
Iris germanica (fl & l)	nil	
15. *Labiatae*		
Marrubium vulgare (fl)	nil	
Melissa vulgare (wp)	nil	
Salvia moorcroftiana (wp)	nil	
Lallemantia royleana (wp)	nil	
Otostegia limbata (wp)	nil	
16. *Leguminoseae*		
Erythrina indica (l)	0.44	
,, ,, (fl)	1.29	
,, ,, (b)	0.55	
Lathyrus aphaca (wp)	0.13	0.63 (B‡)
Astragalus subumbellatus	nil	
17. *Loranthaceae*		
Viscum album (wp)	0.24	(i) 0.42 (AO) (ii) 0.69
18. *Malvaceae*		
Malva parviflora (wp)	0.11	(i) 0.32 (AO) (ii) 0.68
Lavetera kashmiriana (r)	0.13	(i) 0.81 (A‡) (ii) 0.89
19. *Oleaceae*		
Fraxinus excelsior (Fr & l)	nil	
20. *Onagraceae*		
Epilobium hirsutum (wp)	0.1	
21. *Pinaceae*		
Abies webbiana (l)	0.16	0.66 (AO)
22. *Plantaginaceae*		
Plantago major (wp)	0.1	(i) 0.32 (AO) (ii) 0.65
Plantago lanceolata (t & l)	0.26	
23. *Plantanaceae*		
Plantanus orientalis (l)	nil	
24. *Polypodiaceae*		
Adiantum caudatum (l)	nil	
25. *Polygonaceae*		
Polygonum plebajum (wp)	nil	
Rumex vesicarius (wp)	nil	
26. *Portulacaceae*		
Portulaca oleraceae (wp)	nil	
27. *Primulaceae*		
Anagallis arvensis (wp)	0.1	0.28 (AO)
28. *Punicaceae*		
Punica granatum (1)	nil	
29. *Ranunculaceae*		
Ranunculus arvensis (wp)	0.28	0.67 (AO)
Ranunculus muricatus (wp)	nil	
Adonis aestivalis (fl)	0.29	
Actaea spicata (r)	0.26	0.76 (B‡)
Delphinium ajacis (wp)	1.18	
30. *Rhamnaceae*		
Zizyphus sativa (fr & l)	0.26	0.43 (AO)
31. *Rosaceae*		
Rubus fruticosus (r)	0.2	0.71 (AO)
32. *Rubiaceae*		
Galium triflorum (wp)	nil	
Galium asperuloides (wp)	nil	
33. *Rutaceae*		
Peganum harmala (fr)	4.04	
,, ,, (t)	1.28	
,, ,, (t & l)	1.29	
Skimmia laureola (l)	0.9	(i) 0.81 (A‡) (ii) 0.90
Zanthoxylum alatum (b)	0.4	
34. *Salicaceae*		
Populus alba (b)	nil	
35. *Sapindaceae*		
Dodonaea viscosa (fl & l)	nil	
36. *Sapotaceae*		
Madhuca aurantiaca (fr)	0.12	
37. *Scrophulariaceae*		
Verbascum thapsus (l)	0.1	0.69 (AO)
38. *Solanaceae*		
Solanum nigram (l)	0.07	
,, pseudocapsicum (fr);	0.26	
,, ,, (l)	0.35	
39. *Urticaceae*		
Urtica dioica (st)	nil	
,, ,, (l)	nil	
40. *Valerianaceae*		
Valeriana wallichii (l)	0.19	0.22 (AO)
41. *Verbenaceae*		
Vitex negundo (fl)	0.1	(i) 0.45 (AO) (ii) 0.73
Lippia nodiflora (wp)	0.22	0.76 (A‡)
42. *Violaceae*		
Viola serpens (l)	0.24	(i) 0.50 (A‡) (ii) 0.51
43. *Zygophyllaceae*		
Fagonia cretica (wp)	0.07	0.62 (AO)
Tribulus terrestris (wp)	nil	