

Phytochemical Screening of Korean Medicinal Plants (III)

Hyung-Joon CHI and Sook-Youn LEE*

Natural Products Research Institute, Seoul National University and Korean Union College*

한국 약용식물의 화학성분 검색 (III)

지 형 준 · 이 숙 연*

서울대학교 생약연구소 · 삼육대학 약학과*

In continuation of the previous papers, the presence of alkaloid, flavonoid, iridoid, terpenoid, steroid and saponin were screened with the usual test methods in another 53 species of Korean medicinal plants. The result is presented in the Table I.

The subject of phytochemistry or plant chemistry, has developed in recent years as a distinct discipline, somewhere in between natural product organic chemistry and plant biochemistry is closely related to both. It is concerned with the enormous variety of organic substances that are elaborated and accumulated by plants and deals with the chemical structures of these substances, their biosynthesis, turnover and metabolism, their natural distribution and their biological function. Phytochemical progress has been aided enormously by the development of rapid and accurate methods of screening plants for particular chemicals and the emphasis.

The importance of continuing surveys of plants for biologically active substances needs no stressing. Certainly, we think methods of preliminary detection of particular classes of compound are very important.

The results of the preliminary phytochemical tests of 431 plant samples were reported in previous papers¹⁻⁸). In continuation of the program, we now report the results of phytochemical determination of another 50 species.

The presense of alkaloid, flavonoid, Iridoid,

terpenoid, steroid and saponin were screened with the usual test methods. The species of plant was made a collection in various places broadly.

Experiment

Preparation of crude extract: Plants were air dried and extracted with 80% methanol (Twice by 2 hr). The extract was concentrated in vacuo to dryness.

Alkaloid test: The extract (50mg) was placed in a 30ml beaker and 3ml of 2N-HCl was added. The mixture was heated on a water bath, with stirring, for 5-10 minutes. After cooling to room temperature, a small amount of Celite was added. This mixture was briefly shaken and filtered. The filtrate was then made alkaline to litmus paper with 5% NH₄OH and extracted twice with 5ml portions of chloroform. These solutions were combined and the Chloroform evaporated on a water bath. To the residue 2.5ml of 2N-HCl was added the mixture was then stirred briefly, and filtered. A few drops of Mayer's reagent was added to one-half

of the filtrate and a few drops of Dragendorff was added to the other half. If a positive result was obtained with test, we considered that alkaloids having a nitrogen function were present.

Flavonoid test: A solution of the extract (200mg) in 95% ethanol (5ml) was treated with a few drops of conc-HCl and 0.2g of magnesium powders. The presence of Flavonoid was indicated if a pink or magenta red color developed within 3 minutes.

Iridoid test: Fresh tissue (lg), or herbarium material was cut into small pieces and placed in a test tube with 5ml 1% aqueous HCl. After 3-6hr, 0.1ml of the macerate was decanted into another tube containing 1ml of the Trim-Hill reagent⁹⁾. When the tube is heated for a short time in a flame, a colour is produced if certain iridoids are present. The colour is red-violet or blue. Trim-Hill reagent was made up

from 10ml acetic acid, 1ml 0.2% $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in water and 0.5ml C-HCl.

Terpenoid and Steroid test: About 10mg of the dried extract was dissolved into 1ml of acetic anhydride, and the appearance of red-green color on the bordering surface when a few drops of $\text{C-H}_2\text{SO}_4$ was added, was considered a positive test.

Foaming test: A solution of the extract (20mg) in water was vigorously shaken. Presence of saponins was indicated if a characteristic honeycomb froth, which lasts for 30 min. was produces.

Conclusion

The result of these five tests was indicated in table I. We could know that iridoids are very widely distributed in many plants.

Table I. Results of phytochemical screening.

Plant name (Family name)	Part of used	Alk.		Terp.			
		Ma.	Dr.	St.	Fl.	Ir.	Sa.
<i>Trachycarpus fortunei</i> (Palmae)	Lf	-	-	+	+	-	±
<i>Asparagus schoberioides</i> (Liliaceae)	Ap	-	-	+	+	-	+
<i>Aspidistra elatior</i> (Liliaceae)	Lf	-	-	+	-	-	+
<i>Chloranthus japonicus</i> (Chloranthaceae)	Wp	-	-	-	-	+	-
<i>Humulus japonicus</i> (Moraceae)	Ap	-	-	±	-	-	-
<i>Pilea hamaoi</i> (Urticaeaceae)	Wp	+	+	-	-	+	+
<i>Polygonum multiflorum</i> (Polygonaceae)	Ap	+	+	-	+	-	+
<i>Suaeda asparagoides</i> (Chenopodiaceae)	Ap	-	+	±	+	-	-
<i>Achyranthes japonica</i> (Amaranthaceae)	Ap	-	-	±	-	-	-
<i>Amaranthus mangostanus</i> (Amaranthaceae)	Ap	-	-	-	-	-	+
<i>Phytolacca esculenta</i> (Phytolaccaceae)	Lf	±	±	+	-	-	+
<i>Hepatica asiatica</i> (Ranunculaceae)	Lf	-	-	-	-	-	-
<i>Lindera obtusiloba</i> (Lauraceae)	Tw	+	+	+	+	+	±
<i>Argemone pilosa</i> (Rosaceae)	Wp	-	-	+	+	+	+
<i>Spiraea salicifolia</i> (Rosaceae)	Tw	+	+	+	+	-	+
<i>Stephandra incisa</i> (Rosaceae)	Tw	-	-	-	-	-	+
<i>Oxalis martiana</i> (Oxalidaceae)	Lf	-	-	+	-	±	+
<i>Euonymus alatus</i> (Celastraceae)	Tw	-	-	+	+	±	-

<i>Impatiens textori</i> (Balsaminaceae)	Wp	-	-	-	+	-	-
<i>Oenothera lamarckiana</i> (Onagraceae)	Wp	-	-	±	+	-	±
<i>Angelica gigas</i> (Umbelliferae)	Wp	-	-	-	-	-	+
<i>Ostericum grosseserrata</i> (Umbelliferae)	Wp	-	-	+	+	±	+
<i>Ostericum sieboldii</i> (Umbelliferae)	Ap	+	+	+	+	+	+
<i>Peucedanum terebinthaceum</i> (Umbelliferae)	Wp	-	-	±	+	-	+
<i>Pimpinella brachycarpa</i> (Umbelliferae)	Wp	-	-	+	-	-	-
<i>Cornus controversa</i> (Cornaceae)	Lf	-	-	±	+	-	+
<i>Cornus controversa</i> (Cornaceae)	St	-	-	-	+	-	+
<i>Pyrola japonica</i> (Pyrolaceae)	Wp	-	-	-	+	+	-
<i>Lysimachia clethroides</i> (Primulaceae)	Wp	-	-	+	+	+	+
<i>Nerium indicum</i> (Apocynaceae)	Rt	+	+	+	-	-	±
<i>Metaplexis japonica</i> (Asclepiadaceae)	Ap	+	+	-	+	-	-
<i>Elsholtzia ciliata</i> (Labiatae)	Wp	-	-	+	-	±	+
<i>Elsholtzia splendens</i> (Labiatae)	Wp	-	-	+	+	-	±
<i>Erechtites hieracifolia</i> (Labiatae)	Wp	-	-	-	+	-	-
<i>Isodon japonicus</i> (Labiatae)	Ap	-	-	+	+	-	+
<i>Lycopus ramosissimus</i> var. <i>japonicus</i> (Labiatae)	Ap	-	-	+	+	+	+
<i>Meehania urticifolia</i> (Labiatae)	Ap	-	-	-	+	-	+
<i>Mentha arvensis</i> var. <i>piperascens</i> (Labiatae)	Ap	-	-	+	±	+	-
<i>Mosla japonica</i> (Labiatae)	Ap	±	±	+	+	+	+
<i>Melampyrum roseum</i> (Scrophulariaceae)	Ap	-	-	-	-	+	±
<i>Sesamum indicum</i> (Pedaliaceae)	Lf	-	-	±	+	+	+
<i>Rubia akane</i> (Rubiaceae)	Ap	-	-	+	+	+	+
<i>Viburnum sargentii</i> (Caprifoliaceae)	Tw	+	+	+	-	+	±
<i>Patrinia villosa</i> (Valerianaceae)	Ap	-	-	±	+	±	+
<i>Achillea sibirica</i> (Compositae)	Wp	-	-	±	-	-	-
<i>Artemisia keiskeana</i> (Compositae)	Ap	-	-	+	+	+	+
<i>Artemisia lavandulaefolia</i> (Compositae)	Wp	-	+	±	+	+	+
<i>Aster hispidus</i> (Compositae)	Ap	-	-	+	+	-	+
<i>Bidens bipinnata</i> (Compositae)	Wp	-	-	+	+	-	-
<i>Cirsium japonicum</i> var. <i>ussuriense</i> (Compositae)	Wp	-	-	+	+	-	-
<i>Cirsium setidens</i> (Compositae)	Wp	-	-	+	+	-	+
<i>Lactuca indica</i> var. <i>laciniata</i> (Compositae)	Ap	-	-	±	±	-	+
<i>Siegesbeckia glabrescens</i>	Wp	+	+	+	+	-	-
<i>Solidago virga-aurea</i> var. <i>asiatica</i> (Compositae)	Wp	-	+	±	+	+	+

Alk: Alkaloid, Terp: Terpenoid, Ma: Mayer-reagent, Dr: Dragendorff-reagent, St: Steroid, Fl: Flavonoid, Ir: Iridoid, Sa: Saponin.

References

1. L.K. Woo and J.H. Kim; *Seoul Univ. J.(C)*, 13, 1 (1963)
2. L.K. Woo and S.H. Shin; *J. Pharm. Soc. Korea.* 7, 96 (1963)
3. L.K. Woo and H.S. Kim; *J. Pharm. Soc. Korea.* 8, 35 (1964)
4. L.K. Woo and J.H. Kim; *J. Pharm. Soc. Korea.*

- 9, 34 (1965)
5. L.K. Woo and S.H. Toh; *J. Pharm. Soc. Korea.* 10, 12 (1966)
6. L.K. Woo and M.H. Hong; *Asian J. Pharm.* 1, 16 (1968)
7. W.S. Woo, H.J. Chi, H.S. Yun and L.K. Woo; *J. Pharm, Soc. Korea.* 20, 138 (1976)
8. W.S. Woo, H.J. Chi, H.S. Yun, and L.K. Woo; *Kor. J. Pharmacog.* 8, 103 (1977)
9. J.B. Harborne; *Phytochemical Methods*, Chapman and Hall Ltd., London (1973), R.E. Alston; *In Biochemistry of Phenolic Compounds*, Academic Press, London (1964), Geissman, T.A. ed., *Chemistry of the Flavonoid Compounds*, Pergamon Press, Oxford (1962)