

## Iridoid-containing Korean Medicinal Plants (I)

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### 한국산 약용식물의 일리도이드 검색 (I)

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93 species of medicinal plants in Korea were examined for the presence of iridoid. By using Trim-Hill reagent, the presence of iridoid was identified in 34 plant samples.

The structure and Physiological activities of iridoid compounds from plants have been the subject of numerous investigation. The iridoids are characterized by a cyclopentanpyran ring system. The term "Iridoids" as suggested by Briggs *et al.* (1963) shows a relationship with the name of the simplest compound of this class of substances, iridoidal<sup>1)</sup>, which was first reported as an extractive of the common Australian meat ant, *Iridomyrmex detectus*. Most of the iridoid compounds frequently exist as glycosides in plants and degenerative (monoterpene lactones) terpenes are thought as aglycon moieties of the glycosides<sup>2)</sup>. In general iridoid glycosides have a very strong bitter taste. They are very unstable and as hydrolyzing with an enzyme or an acidic solution the color of them rapidly changes from colorless to bluish violet. When they are heated in flame, black resinous precipitates can be obtained. It has also been noted that the dried plant such as *Rhemannia glutinosa* Lib. var. *purpurea* Makino or *Scrophularia buergeriana* Miq. which has iridoid glycoside as a chemical component gradually turns to black during storage.<sup>3)</sup>

Iridoids are the active ingredients of a num-

ber of folk medicines and have been used for centuries, e.g. as bitter tonic, sedative, febrifuge, cough medicine, remedy wounds, against skin diseases and because of their insecticidal or hypotensive effects. Iridoids exhibit a very diverse physiological activity<sup>4)</sup>-antimicrobial activity. Hypotensive effect, analgetic and antiphlogistic property, sedative agent, laxative property, antileukemic activity, etc. For example, catalposide<sup>5)</sup>, and specioside<sup>6)</sup> was separated from *Catalpa speciosa*. We consider that the phytochemical screening of iridoids in Korean medicinal plants has an intense value(meaning).

### Experiment

The various parts of plants (93 species) were air dried and extracted with methanol, and extract were concentrated in vacuo to dryness. Some (0.5g) of extracts was placed in a test tube with 5ml 1% aqueous HCl. 0.1ml of macerate was decanted into another tube containing 1ml of the Trim-Hill reagent<sup>7)</sup> (made up 10ml acetic acid, 1ml 0.2% CuSO<sub>4</sub> · 5H<sub>2</sub>O in water and 0.5ml conc. HCl). When the tube was heated for a short time in a flame, a colour

(blue or red-violet) was produced if certain iridoids were present. It was determined to

positive that the colour was changed to blue or red-violet. We can see the result in Table I.

Plant name (Family name)	Part of used	Collection date	Color*	Serial No.
<i>Equisetum hymale f. genuinum</i> (Equisetaceae)	Hb	Dec. 72	—	B-55
<i>Pteridium aquilinum</i> (Polypodiaceae)	Hb	Sept. 69	—	A-23
<i>Torreya nucifera</i> (Taxaceae)	Sm	Dec. 72	+ R	B-60
<i>Alisma plantago var. parviflorum</i> (Alismataceae)	Bu	May. 72	—	B-48
<i>Cyperus rotundus</i> (Cyperaceae)	Bu	Feb. 73	+ R	B-26
<i>Scirpus martinus</i> (Cyperaceae)	Bu	May. 72	—	B-36
<i>Acorus gramineus</i> (Araceae)	Bh	Dec. 72	—	B-87
<i>Arisaema robustum</i> (Araceae)	Hb	Aug. 69	+ R	A-50
<i>Pinellia ternata</i> (Araceae)	Bu	Mar. 72	+ R	B-3
<i>Spirodera polyrhiza</i> (Lemmaceae)	Hb	Mar. 72	—	B-7
<i>Commelia communis</i> (Commelinaceae)	Hb	Sept. 69	+ RV	A-17
<i>Anemarrhena asphodeloides</i> (Liliaceae)	Rh	May. 72	—	B-35
<i>Asparagus lucidus</i> (Liliaceae)	Bu	May. 72	+ R	B-47
<i>Liriope platyphylla</i> (Liliaceae)	Tu	May. 72	—	B-41
<i>Polygonatum japogonatum</i> (Liliaceae)	Rh	Feb. 73	—	B-28
<i>Smilax china</i> (Liliaceae)	Rh	Mar. 72	±	B-18
<i>Belamcanda chinensis</i> (Iridaceae)	Rh	Dec. 72	—	B-71
<i>Gastrodia elata</i> (Orchidaceae)	Tu	Jun. 71	—	A-40
<i>Aristolochia manshuriensis</i> (Aristolochiaceae)	Ln	Dec. 72	—	B-54
<i>Persicaria viscosa</i> (Polygonaceae)	Hb	Jul. 70	—	A-81
<i>Polygonum aviculare</i> (Polygonaceae)	Hb	Jul. 69	—	A-58
<i>Polygonum cuspidatum</i> (Polygonaceae)	Rh	Dec. 72	+	B-72
<i>Polygonum multiflorum</i> (Polygonaceae)	Rh	May. 72	±	B-39
<i>Rheum undulatum</i> (Polygonaceae)	Rd	Mar. 72	—	B-25
<i>Mirabilis jalapa</i> (Nyctaginaceae)	Hb	Oct. 69	+ R	A-19
<i>Dianthus chinensis</i> (Caryophyllaceae)	Sm	Mar. 72	+ R	B-4
<i>Melampyrum firmum</i> (Caryophyllaceae)	Hb	Mar. 72	+ R	B-6
<i>Aconitum japonicum</i> (Ranunculaceae)	Tu	Mar. 72	+ R	B-19
<i>Actaea asiatica</i> (Ranunculaceae)	Rd	Sept. 69	—	A-37
<i>Cimicifuga heracleifolia</i> (Ranunculaceae)	Rh	Mar. 72	—	B-20
<i>Clematis aptifolia</i> (Ranunculaceae)	Hb	Sept. 69	—	A-45
<i>Clematis tubulosa</i> (Ranunculaceae)	Tw	Sept. 70	—	A-73
<i>Hepatica maxima</i> (Ranunculaceae)	Hb	Aug. 72	±	A-27
<i>Paeonia albiflora var. typica</i> (Ranunculaceae)	Rd	Feb. 73	+ R	B-31
<i>Cocculus trilobus</i> (Menispermaceae)	Hb	Jul. 71	—	A-76
<i>Corydalis ternata</i> (Papaveraceae)	Tu	Dec. 72	—	B-79
<i>Radhanus sativus var. raphanistroides</i> (Cruciferae)	Sm	Mar. 72	—	B-16
<i>Agrimonia pilosa var. japonica</i> (Rosaceae)	Hb	Oct. 69	+ R	A-33
<i>Crataegus pinnatifida var. major</i> (Rosaceae)	Fr	Mar. 72	+ R	B-13

Plant name (Family name)	Part of used	Collection date	Color*	Serial No.
<i>Rubus coreanus</i> (Rosaceae)	Fr	Dec. 72	+ R	B-76
<i>Sanguisorba officinalis</i> var. <i>carnea</i> (Rosaceae)	Rd	Oct. 69	+RV	A-32
<i>Astragalus membranaceus</i> (Leguminosae)	Rd	May. 72	-	A-49
<i>Lespedeza bicolor</i> var. <i>typica</i> (Leguminosae)	Hb	Jul. 71	+ B	A-66
<i>Lespedeza maximowiczii</i> (Leguminosae)	Hb	Jul. 70	±	A-79
<i>Pueraria thunbergii</i> (Leguminosae)	Fr	Oct. 69	-	A-35
<i>Sophora angustifolia</i> (Leguminosae) (=s. <i>flavescens</i> )	Rd	Sept. 69	+ R	A-4
<i>Citrus aurantium</i> var. <i>amara</i> (Rutaceae)	Pp	Mar. 72	-	B-2
<i>Polygala tenuifolia</i> (Polygalaceae)	Rd	Dec. 72	-	B-78
<i>Securinega suffruticosa</i> (Euphorbiaceae)	Tw	Jun. 70	+ R	A-90
<i>Impatiens textori</i> (Balsaminaceae)	Hb	Jul. 69	-	A-60
<i>Rhamnus davurica</i> (Rhamnaceae)	Tw	Sept. 70	-	A-71
<i>Ampelopsis brevipedunculata</i> var. <i>heterophylla</i> (Vitaceae)	Tw	Jul. 70	-	A-83
<i>Ampelopsis japonica</i> (Vitaceae)	Rd	Dec. 72	+ R	B-70
<i>Aralia cordata</i> (Araliaceae)	Rd	Oct. 70	-	A-61
<i>Angelica davurica</i> (Umbelliferae)	Rd	Fed. 72	-	B-32
<i>Angelica gigas</i> (Umbelliferae)	Rd	Dec. 70	-	B-46
<i>Cornus officinalis</i> (Cornaceae)	Fr	Dec. 72	-	B-75
<i>Lysimachia barystachys</i> (Primulaceae)	Hb	Sept. 70	+ R	A-69
<i>Cynanchum atratum</i> (Asclepiadaceae)	Rd	Dec. 72	-	B-69
<i>Cynanchum wilfordii</i> (Asclepiadaceae)	Rh	May. 75	-	B-40
<i>Lithospermum erythrorhizon</i> (Borraginaceae)	Rd	Jun. 70	-	A-44
<i>Clerodendron trichotomum</i> (Verbenaceae)	Tw	Jul. 71	-	A-52
<i>Vitex rotundifolia</i> (Verbenaceae)	Hb	Aug. 71	+RV	A-107
<i>Amethystanthus excisus</i> (Labiatae)	Hb	Jul. 71	-	A-78
<i>Nepeta cataria</i> (Labiatae)	Hb	Jun. 71	-	A-62
<i>Perilla frutescens</i> var. <i>acuta</i> (Labiatae)	Hb	Jun. 71	-	A-105
<i>Scutellaria baicalensis</i> (Labiatae)	Rd	May. 72	-	B-38
<i>Physalis francheti</i> (Solanaceae)	Fr	Feb. 75	+RV	A-59
<i>Melampyrum roseum</i> var. <i>typica</i> (Scrophulariaceae)	Hb	Jul. 70	+ B	A-100
<i>Melampyrum setaceum</i> var. <i>genuinum</i> (Scrophulariaceae)	Hb	Oct. 71	+ B	A-72
<i>Gardenia jasmenoides</i> (Rubiaceae)	Fr	Dec. 72	+RV	B-64
<i>Lonicera japonica</i> (Caprifoliaceae)	Fl	Dec. 72	+ R	B-67
<i>Viburnum sargentii</i> for. <i>sterile</i> (Caprifoliaceae)	Tw	Oct. 70	±	A-109
<i>Patrinia scabiosifolia</i> (Valerianaceae)	Rd	Feb. 72	-	B-33
<i>Codonopsis lanceolata</i> (Campanulaceae)	Rd	May. 72	+ R	B-45
<i>Platycodon grandiflorum</i> (Campanulaceae)	Rd	Nov. 72	±	B-58
<i>Arctium lappa</i> (Compositae)	Sm	Mar. 72	-	B-12
<i>Artemisia capillaris</i> (Compositae)	Hb	Sept. 69	+ B	A-8
<i>Artemisia lavandulaefolia</i> (Compositae)	Hb	Mar. 72	+ B	B-22
<i>Aster tartaricus</i> (Compositae)	Rd	Oct. 72	-	B-27

Plant name (Family name)	Part of used	Collection date	Color	Serial No.
<i>Atractylodes japonica</i> (Compositae)	Rh	Feb. 73	—	B-30
<i>Cephalonoplos segetum</i> (Compositae)	LF	Dec. 72	±	B-68
<i>Chrysanthemum indicum</i> (Compositae)	FL	Mar. 72	—	B-15
<i>Chrysanthemum lavandulae</i> (Compositae)	Hb	Oct. 69	—	A-9
<i>Cirsium maackii</i> (Compositae)	Rd	Dec. 72	+ B	B-84
<i>Chrysanthemum sibiricum</i> (Compositae)	Hb	Dec. 72	+ B	B-63
<i>Echinops setifer</i> (Compositae)	Hb	Jul. 70	+ B	A-92
<i>Inula helenium</i> (Compositae)	Rd	Dec. 72	+ R	B-82
<i>Inula japonica</i> (Compositae)	Fl	Dec. 72	—	B-66
<i>Petasites japonica</i> (Compositae)	Fl	Aug. 70	—	A-43
<i>Siegesbeckia pubescens</i> (Compositae)	Fl	Oct. 69	—	A-31
<i>Taraxacum platycarpum</i> (Compositae)	Hb	Feb. 73	—	B-29
<i>Xanthium strumarium</i> (Compositae)	Fr	Nov. 69	+ R	A-56

\* Color reactions: Blue(B), Red(R), Red violet (RV).

### References

1. H.K. Wagner, P.M. Wolff; New Natural Products and Plant Drugs with Pharmacological or Therapeutic Activity, 145 (1977)
2. I. Inagaki; *Phytochemistry*, 13 117 (1974)
3. B.S. Chung, H.K. Lee, J.W. Kim; *Kor. J. Pharmacog.*, 11, 15 (1980)
4. R. Hänsel; *Deut. Apoth. Z.*, 106, 1761 (1966)
5. R.W. Doskotch, T.W. Odell and P.A. Godwin; *Environ. Entomol.*, 6, 563 (1977)
6. R.W. Doskotch, T.W. Odell and L. Girard; *U.S. Dept. Agric. Tech. Bull.*, 1584 (1979)
7. J.B. Harborne; *Phytochemical Methods*. Academic Press, London, New York, 100 (1973)