

## The *Pueraria* family with special interest in *Pueraria mirifica*

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### INTRODUCTION

The genus *Pueraria* is not abundant in the literature, although there seems to be some correlation between the different species that is encouraging to the phytochemist.

#### *Pueraria lobata*

A species that is native to east and southeast Asia with considerable folklore in China and Japan. The roots yield a starch that is used in speciality foods [Burkill]. Known as *Ge Gen* in Chinese the dried roots are used and sometimes *Pueraria thomsonii* as discussed below. As with most species of this material the roots contain isoflavonoids daidzin, daidzein, puerarin and a number of related glucosides and derivatives. The roots also contain a number of sapogenins and complex sterols (including  $\beta$ -sitosterol) and their glucosides [Zhu].

The properties of the plant are cited for mainly for internal conditions such as coronary and cerebral vasodilation, hypotensive effects, platelet aggregation inhibition,  $\beta$ -adrenergic blocking effect, antiarrhythmic effect, immunostimulant effect, and antipyretic effects [Zhu]. Although the reported effects are mainly internal, the phytochemistry of this plant would suggest great promise in topical preparations.

The plant seems to have enjoyed some success as an alcohol abuse treatment, helping suppress the desire for alcohol. The ground roots (no doubt because of the reported starch they contain) are used in macrobiotic cooking to thicken sauces [Bown].

#### *Pueraria phaseoloides*

This variety of the plant is found across southern, eastern and southeastern Asia. The root though edible is rarely consumed. In Congo, the leaf sap is used to make a preparation for eye troubles and a concoction taken for blennorrhoea.

#### *Pueraria thomsonii*

This species is found in Vietnam and often called kudzu vine or kudzu bean. The tuberous roots are said to contain flavonones and often used as a source of flour. In addition, the plant contains puerarin, daidzen, daidzin and starch. The leaves are rich in amino acids, asparagine and adenine.

The roots are antipyretic (so good for fevers and influenza) and also used for furunculosis, whereas the leaves in decoction is used for the soothing treatment of bites.

#### *Pueraria thunbergiana*

This species is found in the Philippines across many of the islands, as well as being found from India through to Japan and south to Malaya. The leaves are reported to contain glutamic acid, adenine, asparagin and butyric acid and the roots contain starch, which is officinal in the Japanese Pharmacopoeia.

The portion of the root above ground is considered to be poisonous and has emetic properties, while that being below the ground is used for bites and other itching skin conditions. It is also a useful anti-inflammatory. The leaves are attributed with styptic properties and applied to wounds, while the young shoots are considered useful for boils and aphthous mouth ulcers. Every part of the plant is considered useful for the treatment of skin rashes [Quisumbing].

### ***Pueraria tuberosa***

There is another species found in the Western Himalaya and plains of India. Here we find that this species is used as an important constituent of various aphrodisiac preparations. The chemical constituents in the roots have been identified as puerarin (a C-glucoside with the structure 4',6-dihydroxy-7-glucosyl isoflavone) or Diadzein, (7,4'-dihydroxy-isoflavone) or daidzin and 4',6''-di-O-acetylpuerarin. In addition to other materials are reported  $\beta$ -sitosterol and sigmasterol, with the methanolic extract being reported as containing sophoradiol, cantoniensistriol, soya-sapogenols A & B and other complex sterols. The root is used for hypertensive conditions and has been shown to reduce the blood sugar in rats as well as demonstrating an estrogenic activity [Thakur].

This species may be found in Nepal and the Himalayan foothills. The tuberous roots are peeled and bruised into a cataplasm and applied to swollen joints in order to reduce their puffiness [Nadkarni, and Nadkarni].

### ***Pueraria mirifica*** Airy Shaw & Suvatabandhu

This species is an indigenous herb of Thailand, known in Thai as "Kwao Kru" or "Kwao Kru Kao" (White Kwao Kru). It belongs to the Family Leguminosae, subfamily Papilionoideae or the soy, bean & pea subfamily.



It is a big climber tuberous plant. Its branchlets are composed of three leaflets. The leaves have glossy appearance with purplish blue flowers. The pods are flat and the plant can be propagated by seeds. The skin of the tuber root is brownish white with white flesh. Its habitat is in rain forests at high altitudes in the northern part of Thailand, especially at the famous and holy Doi Suthep mountain of Chiang Mai Province.

Active ingredients in this plant are found in the tuberous root. It looks like a chain of round-shaped bulbs of various sizes connected to the next one via small root throughout the entire length of the root. The shape and size of the tuberous root are diverse depending on the environment in which it exists.

The compounds that make *Pueraria mirifica* different from any other phytoestrogen-containing plants in the Family Leguminosae are miroestrol and deoxymiroestrol.

## APPLICATION

*Pueraria mirifica* in the form of extract has been introduced just recently. With modern extraction technology, the extract from dried roots is standardized and prepared in the form of powder and solution. The extract solution is used in cosmetic industry such as preparation of breast cream, eye gel, and skin moisturizer. The extract powder is used as a dietary supplement similarly to the traditional method, but the product has more uniformity due to the advantage of standardization. When *Pueraria mirifica* is taken as a dietary supplement, its phytoestrogen constituents will naturally alleviate symptoms occurring as a result of the aging process and a deficiency in estrogen levels, e.g. sagging breasts, wrinkled skin, bone loss, grey hair, etc. These aging signs and symptoms will, to a certain extent, be reversed.

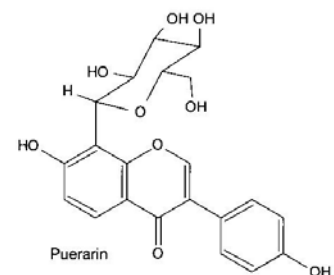
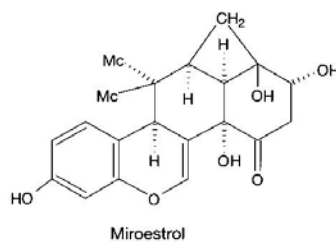
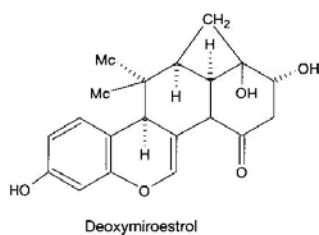
When applied topically to the skin, *Pueraria mirifica* will be beneficial to that respective part of the body. Topical uses of *Pueraria mirifica* have been known to include:

- |                       |                                |
|-----------------------|--------------------------------|
| • Breast Creams       | - Breast firming / Enhancement |
| • Eye Gel             | - Wrinkles reduction           |
| • Body Gel            | - Wrinkles reduction           |
| • Day & Night Cream   | - Wrinkles reduction           |
| • Cataplasm / Patches | - Breast firming / Enhancement |

**WARNING:** *Pueraria mirifica* products should not be used in:

*Pregnant women or nursing mothers due to the lack of safety data*

*Women who are diagnosed with tumors in estrogen-sensitive organ, e.g. ovary, uterus, breast.*



Chromene, isoflavonoid and coumestran derivatives in *Pueraria Mirifica*

### Chromene

Miroestrol

Deoxymiroestrol

### Isoflavone

Puerarin, Puerarin-3-Monoacetate,  
Daidzein, Genistein, Kawakhurin,  
Kawakhurin Hydrate, Daidzin,  
Genistein, Mirificin

## **Coumestans glycosides**

Coumestrol, Mirificoumestan Glycol,  
Mirificoumestan Hydrate

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