

# Mills and Bone Academy

Educational Article

## Gynostemma: The Immortality Herb from Rural China – Kerry Bone

*Gynostemma pentaphyllum* (family Cucurbitaceae) is a climbing perennial vine native to China, Japan and parts of Southeast Asia, including Vietnam. Although it has the Traditional Chinese Medicine (TCM) name, jiaogulan (pronounced jow-goo-lan), its use in TCM is not widespread and it is often missing from TCM texts. This is thought to be because it grows mostly in the mountainous regions of southern China, far away from the central area of China where TCM evolved.<sup>1</sup> However, the leaves were first described as a medicinal plant in TCM texts in 1578.

According to a recent review:<sup>1</sup>

“Jiaogulan has been used by the people in the mountainous regions of Southern China as an energizing agent. They would take it as a tea before work to increase endurance and strength, and after work to relieve fatigue. It has also been taken for general health and has been recognized as a rejuvenating elixir.

People also used it for treating common colds and other infectious diseases. Hence, the local Chinese people called jiaogulan, xiancao the “Immortality Herb,” and described it thus: “Like ginseng but better than ginseng.”

Another story states that in a village near Fanjing Mountain in Guizhou province, the inhabitants would drink jiaogulan tea instead of the more common green tea and as a result many people there were living to 100 years of age.”

Other common names testifying to its adaptogenic and longevity properties include miracle grass, longevity herb, poor man’s ginseng and sweet tea vine (apparently, it does taste slightly sweet, like good quality *Panax ginseng* root). Its TCM properties are said to be warm, enhancing Yin and supporting Yang.

## Key constituents

The leaf of *Gynostemma* resembles Asian ginseng (*Panax ginseng*) and so does its chemistry. A large series of more than 80 dammarane triterpene saponins (with similar skeleton to the ginsenosides, which are also dammarane triterpene saponins) have been identified in the leaf.<sup>i</sup> These are known as the gypenosides and at least eight of these are identical to those found in *Panax species*. Several of these saponins are identical to those found in ginseng. Specifically, gypenoside 3 is identical to ginsenoside Rb1, gypenoside 4 is identical to ginsenoside Rb3, gypenoside 8 is identical to ginsenoside Rd, and gypenoside 12 is identical to ginsenoside F2. Many of the other gypenosides are closely related structurally to the ginsenosides, and include the 6'-malonyl derivatives that are characteristic of ginseng. The total content of saponins is comparable to that of ginseng roots.<sup>i,ii</sup>

## Pharmacology

A range of pharmacological properties have been demonstrated in various experimental models, such as antiallergic activity (*in vivo*, oral), immune enhancement (*in vivo*, injection and oral), anticancer activity (*in vitro*), adaptogenic activity (*in vivo*), neuroprotection (*in vivo*, oral), antitoxic activity (*in vivo*, oral) and hypoglycaemic activity (*in vivo*, oral).<sup>i</sup>

But of significant interest is the discovery by Japanese scientists that the extract (and specifically the gypenosides) activate AMPK *in vitro* and *in vivo*.<sup>iii,iv</sup> AMPK is often referred to as the master metabolic regulator, because it switches on the catabolic (energy producing) processes in the cell in a similar manner to exercise. By regulating metabolic activity in key structures (such as the liver, adipose tissue and skeletal muscle), AMPK improves energy expenditure, glucose utilisation and modulates appetite. Through these pathways, it can favourably impact insulin resistance, blood sugar levels and body weight and fat (especially abdominal fat around key visceral organs such as the liver and pancreas).

There is also a considerable number of *in vitro* and *in vivo* studies investigating *Gynostemma* and its compounds in cancer models. This Chinese research suggest significant activity via a number of mechanisms.<sup>v</sup>

## Clinical trials

*Gynostemma* has been assessed in the management of type 2 diabetes (T2D) in several clinical trials. This work is from Vietnamese scientists, where *Gynostemma* is a highly regarded medicinal plant.

In a placebo-controlled pilot trial, 24 patients with T2D were randomised to receive Gynostemma leaf (6 g/day of an aqueous extract) or placebo for 12 weeks.<sup>vi</sup> After 12-week treatment, fasting plasma glucose levels totally decreased to an extent of  $3.0 \pm 1.8$  mmol/L in the Gynostemma tea group as compared to a decrease of  $0.6 \pm 2.2$  mmol/L in the control group ( $p < 0.01$ ). HbA1c levels after 12 weeks decreased approximately 2% units in the Gynostemma group compared to 0.2% unit in the controls ( $p < 0.001$ ). Insulin resistance was also lower in the herbal group.

Another trial indicated the Gynostemma could combine well with the commonly used sulfonylurea drug gliclazide.<sup>vi</sup> After a 4-week pretreatment with the drug, 25 T2D patients were randomised to additionally receive either Gynostemma leaf (6 g/day of an aqueous extract) or a placebo for another 8 weeks. There were significant improvements in fasting blood glucose, the oral glucose tolerance test and HbA1c for the herbal group versus placebo, indicating additional benefit over and above the action of the sulfonylurea drug.

In another small crossover trial, 16 drug-naive T2D patients received either Gynostemma leaf (6 g/day of an aqueous extract) or a placebo for 6 weeks and then vice versa, with a two-week washout period before the changeover.<sup>vii</sup> The herb resulted in a

significant drop in fasting blood glucose versus placebo ( $-1.9$  mmol/L versus  $-0.2$  mmol/L,  $p < 0.001$ ) and significant improvement in insulin sensitivity, despite the fact that these T2D patients had normal body mass indices (BMIs).

Chinese researchers found that a dose of decoction from 9 g of steam-dried Gynostemma leaves improved uric acid levels in patients with non-alcoholic fatty liver disease.<sup>viii</sup> In this randomised, single blind trial, 28 patients with fatty liver confirmed by ultrasound took the decoction and followed a designated diet for 4 months (active group) while another 28 followed just the diet (control group). There was also a prior run-in period where both groups followed the diet for two months. Compared to the control group, only uric acid showed a significant reduction. However, BMI dropped significantly from baseline only in the active group. There were many favourable other changes in both groups (eg lower triglycerides and fatty liver score).

The effects of a heat-processed *Gynostemma pentaphyllum* extract were investigated on body weight, fat loss, and metabolic markers of Korean participants in a 12-week, randomised, double blind, placebo-controlled clinical trial.<sup>ix</sup> Overweight participants (BMI  $\geq 25$  kg/m<sup>2</sup> and waist-hip ratio WHR  $\geq 0.90$  for men or WHR  $\geq 0.85$  for women) who

had not been diagnosed with any disease and met the inclusion criteria were recruited for the study. The 80 subjects were randomly divided into herbal (n = 40, 450 mg/day) and placebo (n = 40) groups. Outcomes included measurement of efficacy (abdominal fat distribution, anthropometric parameters and blood lipid profiles) and safety (adverse events, laboratory test results, electrocardiogram data and vital signs).

During 12 weeks of treatment, total abdominal fat area, body weight, body fat mass, percent body fat and BMI were all significantly decreased ( $p = 0.044$ ,  $p < 0.05$ ,  $p < 0.0001$ ,  $p < 0.0001$ , and  $p < 0.05$ , respectively) in the active group compared to the placebo group. No clinically significant changes in any safety parameter were observed. Specifically, patients in the herbal group lost 1.25 kg of body fat versus an increase of 0.28 kg in the control group. The trial did have limitations, as pointed out by the authors, since diet was not closely controlled.

A review of clinical studies from China in cancer patients noted protection against immune suppression or improved immune function in cancer patients, before or after standard medical treatment with radiation and/or chemotherapy. There was also a reduced frequency of relapse and metastasis seen in one trial.<sup>5</sup>

## Therapeutic uses

- As an adaptogen to improve the stress response and facilitate healthy ageing
- Type 2 diabetes and metabolic syndrome
- Fatty liver disease
- To assist with weight loss
- Adjuvant therapy in cancer
- Other potential uses include allergies and infections (the latter is said to be a traditional use)
- Other uses may be revealed by a closer examination of the Chinese literature. For example there are reports of clinical trials for bronchitis treatment, hypertension and cholesterol lowering.<sup>i</sup>

## Dosage

2 to 6 g per day dried herb equivalent, for example 2 to 6 mL per day of a 1:1 liquid extract.

## Toxicity and safety

The acute and chronic toxicity of *Gynostemma* is low, with little adverse effects recorded from high doses in rodent studies.<sup>i,x</sup>

Side effects recorded in the clinical trials were mild.

## References

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