

## Andawali (*Tinospora crispa*) – a review

**Anthony C. Dweck** FLS FRSC FRSH

Technical Editor

and

**Jean-Pierre Cavin**

Managing Director E.U.K.

Contact Jean-Pierre Cavin at E.U.K., 25, rue Georges Bizet, 92000 Nanterre, France.  
Tel : 33 (0)1 42 42 05 05, Fax : 33 (0)1 42 42 32 02

### Introduction

This plant has been known in the west since the beginning of the last century and one of the first references we found was in a very old and revered reference book. It had not surfaced in the 15<sup>th</sup> edition of 1883 but it was in the 20<sup>th</sup>.

The Dispensatory of the United States of America. 20th edition. 1918.

*“Tinospora. Br. Add. 1900.—“The dried stem of Tinospora cordifolia Miers (Fam. Menispermaceae), collected in the hot season.” Br. Add., 1900. Tinospora has long been used in India as a medicine and in the preparation of a starch known as gilae-ka-sat or as palo. It is said to be a tonic, antiperiodic, and a diuretic. Flückiger obtained from it traces of an alkaloid and a bitter glucoside. The Br. Add., 1900, recognized an infusion (Infusum Tinosporae Br. Add., 1900, two ounces to the pint), dose one-half to one fluidounce (15-30 mils); a tincture (Tinctura Tinosporae Br. Add., 1900, four ounces to the pint), dose, one-half to one fluidrachm (1.8-3.75 mils); and a concentrated solution [Liquor Tinosporae Concentratus Br. Add., 1900), dose, one-half to one fluidrachm (1.8-3.75 mils). Tinospora crispa Miers (more), which is abundant in the Philippines, is used freely by the natives under the name of makabuhay (that is, "You may live"), as a panacea, especially valuable in general debility, in chronic rheumatism, and in malarial fevers. It may be prepared in the same way and given in the same doses as Tinospora cordifolia.” [Wood et al]*

It was still in the 23<sup>rd</sup> edition.

This plant has many traditional uses for the treatment of the skin and would make an excellent addition to skin care products for the mature woman between 40 and 60 who wants to maintain her beauty.

### Names

The accepted name is *Tinospora crispa* but there are numerous synonyms *Menispermum crispum* Linn., *Menispermum rimosum* Blanco, *Tinospora*



cordifolia F.-Vill., *Cocculus cordifolius* Walp., *Cocculus villosus* DC. *Tinospora crispa* (L.) Miers ex Hook. f. & Thoms., *Tinospora tuberculata*, *Tinospora rumphii*, *Cocculus crispum*, *Menispermum tuberculatum*, *Menispermum verrucosum* (N.O. \_Menispermaceae)

### Description

A climber found in tropical and subtropical India and parts of the Far East, and in primary rainforests or mixed deciduous forests throughout the Philippines; in tropical Asia at altitudes up to 1000 metres this tropical liana (woody) with shiny green leaf is also widely distributed in Indonesia, Malaysia (and Borneo), Thailand and Vietnam.

### Local names

Local names: *Makabúhai* (Tag., Bis., Ilk.); *paliaban* (Bis.); *panauan* (Bis.); *pangiauan*. (Bis.) ; *pangiauban* (Bis.); *sangaunau* (Bag.); *taga-nagtagua* (Bis.). [Quisumbing], Hindi: *dier*, *faridbuti*. Tel: *dooara-tiga*. Beng: *huya* [Drury]. Sans-jalamni: *patalagarudi*; *vasanavalli*; *vanatiktika*. Hind.: *faridbel*; *jamtike bet*. Ben.: *huyer*. Mah.: *vasanvel*; *tana*. Guj.: *patalagalori*. Duk.: *jamti-ka gratta*. Tam.: *kattukodi*. Tel.: *chipuru-tige*; *kattle-ti*. Can.: *dagadi*. [Nadkarni], *paliahan* (Bisaya). Tamil: *kattukkodi*, Telugu: *chipuru-tige* ; *kattle-ti*, Malayalam: *dagadi*, Kannada: *vasanvel* ; *tana*, Marathi: *faridbel*; *jamtike bel*. Indonesia: *bratawali*, *andawali*, *putrawali*, *daun gade*. Thai : บอระเพ็ด , *boraphet* , *wan kab hoi yai*



### Chemical composition

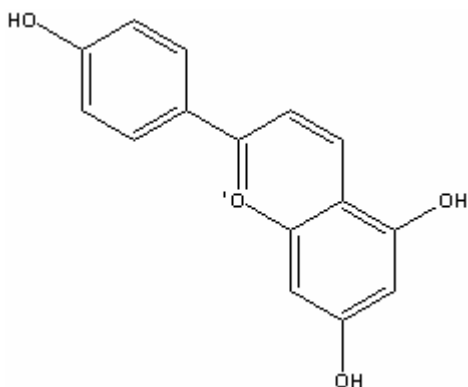
The whole plant contains a bitter principle, colombine, 2.22%; traces of an alkaloid; and a glucoside. It also contains an amorphous bitter principle, picroretine, and traces of berberine. Later, from the root-bark a bitter principle (which is not a glucoside) and some alkaloid was isolated.

Picroretine was isolated from the leaves with traces of an alkaloid, and a substance similar to glycyrrhizin. In the Philippines it was reported that the bitter, aqueous extract of the stem does not contain an alkaloid, but they found amorphous and resinous substances. When the plant was re-examined it was concluded that it contains berberine, a glucoside and a bitter principle which was glucosidal in nature.

There are also two alkaloids are present, tinosporine and tinosporidine, though later studies did not confirm these. [Quisumbing]. According to another author there is a resin, two principles possessing the properties of alkaloids, but differing in certain points from each other, and an acid; resin, yellowish-green and soft, of fragrant odour like that of Tolu balsam and soluble in benzene [Nadkarni].

Bergenin a new antioxidant and free radical scavenging agent has been isolated. [[http://www.rrljammu.org/rnd\\_groups/Pharmacology/activities/isolation\\_and\\_characterization\\_of\\_marker.htm](http://www.rrljammu.org/rnd_groups/Pharmacology/activities/isolation_and_characterization_of_marker.htm) ( Indian; 1099/DEL/2001)].

Three compounds, identified as N-cis-feruloyltyramine, N-trans-feruloyltyramine and secoisolariciresinol, exhibiting antioxidant and radical scavenging properties towards  $\beta$ -carotene and 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical, were isolated from the  $\text{CH}_2\text{Cl}_2$  extract of stems of *T. crispera* (collected from Indonesia) [Cavin *et al*].



Two triterpenes from the stems of *Tinospora crispera* (collected in Supanburi, Thailand), namely cycloeucalenol and cycloeucalenone [Kongkathip *et al*].

Fig.1 Apigenin (a flavonoid)

*Tinospora crispera* stem contains: flavone O-glycosides (apigenin), picroretoside, berberine, palmatine, picroretine, and resin.

Five flavonoids were newly isolated from *T. crispera* stems, collected from Serdang. [Umi Kalsom *et al*]

### Parts Used

Root and leaves.

The root is bitter and acrid; sudorific, alterative, laxative and demulcent; and is used as a substitute for sarsaparilla. It is antiperiodic in fevers, tonic, alterative and diuretic [Nadkarni].

### Folklore and ethnopharmaceutical uses

In Java (Indonesia) the main products of traditional medicine, called *jamu*, come from different parts of more than 120 species, such as *Pluchea indica* (bluntas), *Graptophyllum pictum* (daun wungu), *Zingiber officinale* (jahe), and *Tinospora crispera* (brotowali).

An ethnic Group in Sabah (Borneo), the Murut community, traditionally uses *Tinospora crispera* to treat diabetes, hypertension, and lumbago. [Fasihuddin]

Traditionally used in Thai traditional medicine, *Tinospora crispa* is one ingredient in Thai folk remedies for maintaining good health. A decoction of the stems, leaves and roots is used to treat fever, cholera, diabetes, rheumatism and snake-bites, an infusion of the stem is drunk as a vermifuge, a decoction of the stem is used for washing sore eyes and syphilitic sores, the crushed leaves are applied on wounds and made into poultice for itch. Also it reduces thirst, internal inflammation, and increases appetite. The drug (stem) is registered in the Thailand Pharmacopoeia, and commonly use in hospital to treat diabetes.

In Vietnam the southern pharmacopoeia was developed and adapted in the 14th century by the monk Tue Tinh, to treat Vietnamese for diseases common to the tropics, while keeping the principles of Chinese medicine and blending into it the qualities of southern plants known to traditional popular medicine. To treat Malaria they use the *Tinospora crispa* described by Dr Sallet (1930): "bitter vine, held as vine-quinine", also called "vine with genie's intelligence" (*day than thong*).

In general folklore, the stem decoction is considered antipyretic, useful as an anti-malarial and a wash for skin ulcers. Traditionally an infusion is used to treat fever due to malaria and also in cases of jaundice and for use against intestinal worms. The antimalarial effect was confirmed in a study [Rahman *et al*]. A decoction of the stems, leaves and roots is used to treat fever, cholera, diabetes, rheumatism and snake-bites. An infusion of the stem is drunk as a vermifuge. A decoction of the stem is used for washing sore eyes and syphilitic sores. The crushed leaves are applied on wounds and made into poultice for itch. [<http://www.frim.gov.my/tu/tinospora.htm>]

The Filipinos and Malays consider this vine as a universal medicine. It is the most popular of local medicinal plants. Makabühai, the common Tagalog name, means "to give life". It is commonly prescribed as an aqueous extract in the treatment of stomach trouble, indigestion and diarrhoea. It is the basis of a popular preparation, which is used as a cordial, or an ingredient in cocktails. It is also an effective remedy in the treatment of tropical ulcers. In powder form, it is prescribed in fevers. A preparation with coconut oil is an effective cure for rheumatism and also for flatulence of children (kabag). [Quisumbing]

A decoction of the fresh root mixed with pepper and goat's milk is given for rheumatism, where the dose is half a pint (in doses of two to four ounces according to another author under chronic rheumatism and syphilitic cachexia) every morning. It is said to be laxative and sudorific. When under this treatment the natives make a curry of the leaves, which they recommend to their patients. The leaves when agitated in water render it mucilaginous and is then sweetened with sugar and drunk when freshly made (half a pint taken twice-a-day). This is given for the cure of gonorrhoea [Drury] and is said to soothe the smarting and scalding [Nadkarni]. It is also used externally as a cooling and soothing application in prurigo, eczema, impetigo, etc.

If allowed to stand for a few minutes, the mucilaginous parts separate, contract and float in the centre. “Leaving the water clear like Madeira wine, and almost tasteless”. [Drury]

Decoction of the root in combination with ginger and sugar is given in cases of bilious dyspepsia and in cases of fevers with other bitters and aromatics. Roots rubbed with bonduc nuts in water are given for stomachache, especially in children [Nadkarni]. Indonesians use an infusion of the stems to treat fevers and malaria. They can also be used to treat stomachache and jaundice. The infusion is also useful in fevers caused by smallpox and cholera. Another popular use of this infusion is in a mixture for treating indigestion.

### **Medicinal use**

The efficacy of *Tinospora crispa* extract for the treatment of diabetes has previously been verified in animal models. The results showed that the antihyperglycaemic effect is not due to interference with intestinal glucose uptake or uptake of the sugar into the peripheral cells and that the antihyperglycaemic effect of *T. crispa* is probably due to stimulation of insulin release via modulation of beta-cell  $Ca_{2+}$  concentration. That the insulinotropic effect of *T. crispa* is physiological suggests that the extract contains compounds which could be purified for use in the treatment of type II diabetes [Noor *et al*].

*Tinospora crispa* is as effect an appetite enhancer as compared against the reference drug megestrol acetate [Sartori *et al*].

The cycloeucalenol and cycloeucalenone present in the stems produced mild cardiotoxic effects [Kongkathip *et al*].

### **Method of preparation and dosage**

Boil chopped stem, 30 g fresh or 25 g dried, in 3 glasses of water for 20 minutes. Strain. Take ½ glass of the decoction twice a day before meals.

### **Cosmetic effects**

“*Andrographis paniculata* (*Fah-ta-lai-jone*) and *Tinospora crispa* (*Bo-ra-ped*) are commonly used in Thai herbal medicine for the relief of symptoms associated with fever and infection. *In vivo* animal experimental study (at a high dose level) has also demonstrated the anti-inflammatory effect”.

In cosmetics *Tinospora crispa* can be used externally for its strong anti-oxidant and antiradical properties. Flavonoids (amongst them apigenin) are best known for their ability to act as powerful anti-oxidants, and also have anti-allergic and antiviral properties.

### **Contraindications**

Bitter taste not agreeable to most people. Avoid giving to pregnant women and nursing mothers.

### **Toxicological studies**

Acute toxicity study of ethanolic extract of *Tinospora crispa* stem in mice showed that the extract at the highest oral dose of 4.0 g/kg of body weight (g/kg BW), which was equivalent to powdered crude drug 28, 95 g/kg BW, did not produce any signs of toxicity. The results of the chronic toxicity study of ethanolic extract of *Tinospora crispa* suggested that, due to the hepato-toxic and renal toxic potential of the extract observed in rats, prolonged use of high doses of *T. crispa* in humans should be avoided or if signs of liver or renal toxicities occur while using *T. crispa* - containing herbal medicine, the drug should be discontinued immediately. [Pranee *et al*].

Oral toxicity: Not considered as toxic (DL 50 oral/rats > 40 g/kg)

Skin irritation: Not irritant

Skin sensitisation: Not sensitising

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