

Gotu kola

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Memory is the ability of an individual to record sensory stimuli, events, information, etc. and to retain them over short or long periods of time and recall the same at a later date when needed.

Poor Memory, lower retention and slow recall are common problems in today's stressful and competitive world. Age, stress and emotions are conditions that may lead to memory loss, amnesia, anxiety, high blood pressure, dementia, to more ominous threat like schizophrenia and Alzheimer's diseases.

The nature provides a new opportunity to regain one's full mental capacity. A number of herbs traditionally employed in the Indian System of Medicine "Ayurveda", have yielded positive results.

One such drug here we are discussing....

Gotu kola



Family Name : APIACEAE

Botanical Name : CENTELLA ASIATICA

Synonym(s) : *Hydrocotyle asiatica* Linn, *Hydrocotyle nummularioides* Rich, *Hydrocotyle pallida* DC.&c.

Common Name : PENNYWORT, INDIAN PENNYWORT, JAL BRAHMI,

Part Used : WHOLE PLANT

Habitat : Grown in waterlogged places throughout India. Gotu kola is a perennial plant native to India, Japan, China, Indonesia, South Africa, Sri Lanka, and the South Pacific. It is a tasteless, odorless plant that thrives in and around water.

PLANT PROFILE

A prostrate, perennial herb. **The stem** is slender, creeping stolons, green to reddish green in color, interconnecting one plant to another. It has long-stalked, green, reniform leaves with rounded apices which have smooth texture with palmately netted veins. The leaves are born on pericladial petioles, around 20 cm. The rootstock consists of rhizomes, growing vertically down. They are creamish in color and covered with root hairs. **The leaves** are fleshy, orbicular-reniform, crenate, base cordate and often lobed and long-petioled. **The flowers** are pinkish to red in color, born in small, rounded bunches (umbels) near the surface of the soil. Each flower is partly enclosed in two green bracts. The hermaphrodite flowers are minute in size (less than 3 mm), with 5-6 corolla lobes per flower. Each flower bears five stamens and two styles. **The fruits** are oblong, dull brown, laterally compressed; the pericarp hard, thickened, woody and white.

The crop matures in three months and the whole plant, including the roots, is harvested manually.

HISTORY OF SPECIES

It has been in use, as a medicinal herb, for thousands of years in India, China and Indonesia. Its ability to **heal wounds**, **improve mental clarity**, and treat skin conditions such as **leprosy** and **psoriasis** were important reasons for its extensive use in these countries. It has also been called one of the "**miracle elixirs of life**".

Historically, gotu kola has also been used to treat syphilis, hepatitis, stomach ulcers, mental fatigue, epilepsy, diarrhea, fever, and asthma. Today herbalists use gotu kola for disorders that cause **connective tissue swelling**, such as **scleroderma**, **psoriatic arthritis** (arthritis occurring in conjunction with psoriasis), **anklylosing spondylitis** (arthritis of the spine), and **rheumatoid arthritis**. Recent studies confirm some of the traditional uses and also suggest possible new applications for gotu kola, such as lowering **high blood pressure**, treating **venous insufficiency** (pooling of blood in the veins, usually in the legs, **boosting memory** and **intelligence**, **easing anxiety**, and **speeding wound healing**.

Gotu kola should not be confused with **kola nut (Cola nitida)**. Kola nut is an active ingredient in Coca Cola and contains caffeine. Gotu kola has **no caffeine**, and is **not a stimulant**.

General Uses

It is used as a medicinal herb in **Ayurvedic Medicine** and **Traditional Chinese medicine**. It is used as a Tonic, Diuretic and Alterative. It is used in treatment of leprosy and known to ameliorate the symptoms of the disease and improves general health of the patient. It is a brain tonic and stimulates hair growth.

Gotu kola is a very useful medicinal plant described by **Charaka** as an **anti-aging plant**. Apart from its role as a **brain tonic**, its efficacy in treating **tuberculosis, syphilis, amoebic dysentery** and **common cold** is well documented in the literature.

DISEASE RELATED USES

Wound Healing and Skin Lesions

Gotu kola contains triterpenoids, compounds that have been shown to aid in wound healing. For example, animal studies indicate that triterpenoids strengthen the skin, increase the concentration of antioxidants in wounds, and restore inflamed tissues by increasing blood supply. Because of these properties, gotu kola has been used externally for burns, psoriasis, prevention of scar formation following surgery, recovery from an episiotomy following vaginal delivery of a newborn, and treatment of external fistulas (a tear at or near the anus).

Venous Insufficiency and Varicose Veins

When blood vessels lose their elasticity, blood pools in the legs and fluid leaks out of the blood vessels, causing the legs to swell (venous insufficiency). In a study of 94 people with venous insufficiency, those who took gotu kola reported a significant improvement in symptoms compared to those who took placebo. In another study of people with varicose veins, ultrasound examination revealed improvements in the vascular tone of those who took gotu kola.

High Blood Pressure

In a study of people with heart disease and high blood pressure, those who took abana (an Ayurvedic herbal mixture containing gotu kola) experienced a significant reduction in diastolic blood pressure (pressure on blood vessels when the heart is at rest) compared to those who took placebo. Further studies are needed to determine whether gotu kola alone, some other herb in the Ayurvedic mixture, or the particular combination of all the herbs in the remedy is responsible for the beneficial effect.

Anxiety

Triterpenoids (active compounds in gotu kola) have been shown to soothe anxiety and boost mental function in mice. A recent study found that people who took gotu kola were less likely to be startled by a novel noise (a potential indicator of anxiety) than those who took placebo. Although the results of this study are somewhat promising, the dose used in this study was extremely high, making it difficult to draw any conclusions about how gotu kola might be used by people with anxiety.

Scleroderma

One study involving 13 females with scleroderma found that gotu kola decreased joint pain, skin hardening, and improved finger movement.

Insomnia

Because of sedative effects demonstrated in animals, gotu kola has been used to help people with insomnia.

Pregnancy / Breastfeeding

No information

Age Limitations

Neonates / Adolescents

No information

CHILDREN

There is currently no information in the scientific literature about the use of gotu kola for children.

ADULT

The adult dosage of gotu kola may vary depending on the condition being treated.

Geriatrics

No information

Chronic Disease Conditions

No information

SIDE EFFECT

Rare but may include skin allergy and burning sensations (with external use), headache, stomach upset, nausea, dizziness, and extreme drowsiness. These side effects tend to occur with high doses of gotu kola.

SCIENTIFIC STUDIES

A double-blind, placebo-controlled study on the effects of Gotu Kola (*Centella asiatica*) on acoustic startle response in healthy subjects. *Bradwejn J, Zhou Y, Koszycki D, Shlik J.* Royal Ottawa Hospital and the Department of Psychiatry, University of Ottawa , Ontario , Canada . **Results** of preliminary findings suggest that Gotu Kola has anxiolytic activity in humans as revealed by the ASR. It remains to be seen whether this herb has therapeutic efficacy in the treatment of anxiety syndromes.

An in vitro study of the effect of *Centella asiatica* [Indian pennywort] on enteric pathogens. *By-Mamtha B, Kavitha K, Srinivasan KK, Shivananda Manipal,* India. **Results** of study demonstrate the antimicrobial activity of *Centella asiatica* against the enteropathogens. Its potential as an antidiarrheal drug is worth studying.

Antinociceptive and antiinflammatory effects of *Centella asiatica*. *By-Somchit MN, Sulaiman MR, Zuraini A, Samsuddin L, Somchit N, Israf DA, Moin S* Selangor, Malaysia.

Anti-oxidant activity of *Centella asiatica* on lymphoma-bearing mice. *By- Jayashree G, Kurup Muraleedhara G, Sudarslal S, Jacob VB.* Kottayam, Kerala 686560, India. **Results** show that Oral treatment with 50 mg X kg⁽⁻¹⁾ day⁽⁻¹⁾ of crude methanol extract of *Centella asiatica* for 14 days significantly increased the anti-oxidant enzymes, like

superoxide dismutase (SOD), catalase and glutathione peroxidase (GSHPx), and anti-oxidants like glutathione (GSH) and ascorbic acid decreased in lymphoma-bearing mice.

Chemical, pharmacological and clinical profile of the East Asian medical plant *Centella asiatica*. *Brinkhaus B, Lindner M, Schuppan D, Hahn EG.* Department of Traditional and Complementary Medicine, Medical Department I, Friedrich-Alexander University, Erlangen-Nuremberg, Germany. *Centella asiatica* is a medicinal plant that has been in use since prehistoric times. Its active constituents include pentacyclic triterpene derivatives. Studies have been conducted in particular to investigate the madecassosides and asiaticosides. In common with most traditional phytotherapeutic agents, *Centella asiatica* is used in folk medicine to treat a wide range of indications. In contrast to other medicinal plants, however, *Centella asiatica* has been subjected to quite extensive experimental and clinical investigations. Studies done in accordance with standardized scientific criteria have shown it to have a positive effect in the treatment of venous insufficiency and striae gravidarum. *Centella asiatica* also appears to be effective in the treatment of wound healing disturbances. At the present time, clinical studies aimed at investigating the sedative, analgesic, antidepressive, antimicrobial, antiviral and immunomodulatory effects that have been demonstrated experimentally, are still lacking. However, the therapeutic potential of this plant in terms of its efficacy and versatility is such that further detailed research would appear worthwhile.

Effect of *Centella asiatica* on cognition and oxidative stress in an intracerebroventricular streptozotocin model of Alzheimer's disease in rats. By-*Veerendra Kumar MH, Gupta YK.* New Delhi , India .**Results** of the present findings indicate that an aqueous extract of *C. asiatica* is effective in preventing the cognitive deficits, as well as the oxidative stress, caused by i.c.v. STZ in rats.

Effect of *Centella asiatica* on pentylenetetrazole-induced kindling, cognition and oxidative stress in rats. *Gupta YK, Veerendra Kumar MH, Srivastava AK.* Neuropharmacology Laboratory, Department of Pharmacology, All India Institute of Medical Sciences, Ansari Nagar, 110029, New Delhi , India . **Results** of the findings suggest the potential of aqueous extract of CA as adjuvant to antiepileptic drugs with an added advantage of preventing cognitive impairment.

Hepatoprotective effect of *Centella asiatica* (L) in carbon tetrachloride-induced liver injury in rats By-*Antony B, Santhakumari G, Merina B, Sheeba V, Mukkadan J* R & D Laboratory, Arjuna Natural Extracts Ltd. Kerala, India. **Results** include *Centella asiatica* extract exhibited hepatoprotective action against carbon tetrachloride-induced liver injury. This effect is attributed to the presence of asiaticoside (14.5%) in the extract.

Radioprotection of Swiss albino mouse by *Centella asiatica* extract. *Sharma J, Sharma R.* Department of Zoology, University of Rajasthan , Jaipur 302004, India. *Centella asiatica*, has a considerable reputation in the Indian system of medicine. It is a rasayan (general tonic), brain tonic, improves memory and strengthens the CNS. In view

of its multifarious uses, the plant extract was tested for its radioprotective properties. **Results** A sublethal dose of Co 60 gamma radiation, i.e. 8 Gy was selected for the purpose. Body weight loss of the animals in the drug treated group was significantly less in comparison with the animals that were given radiation only. The causes and mechanism of protection and other aspects need further investigations.

Chemical Constituents

Active principles are pentacyclic triterpenes, namely, asiatic acid, asiaticoside, madecassic acid and madecassoside. Triterpenes with healing potential were isolated, namely, terminolic acid, asiaticoside-B while scelefoleoside A and saponins (centellasaponins B,C and D) with four ursane- and oleanane-type triterpene oligoglycosides were isolated from *Centella asiatica* grown in Sri Lanka. Other minor saponins are centelloside, brahmoside and brahminoside. The essential oil from *Centella asiatica* grown in South Africa contains 11 monoterpenoid hydrocarbons (20.2%), 9 oxygenated monoterpenoids (5.46%), 14 sesquiterpenoid hydrocarbons (68.8%), 5 oxygenated sesquiterpenoid (3.9%) and 1 sulphide sesquiterpenoid (0.76%). The predominant constituents were β -caryophyllene (19.08%), bicyclogermacrene (11.22%), germacrene B (6.29%) and myrcene (6.55%). Other reports included trans- β -farnesene and germacrene D as prominent constituents of the essential oil.

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