



Dr.Tapas Bhaduri, M.D. Das
MahapatraKousik*, Dr.Ekta
M.D.,

1. (Ayurveda), Medical officer,
Govt. of West Bengal

2.M.D., Ph.D (Ayurveda)
Lecturer, (Basic principles)A &
U Tibbia College, Ajmal Khan
Road, Karolbagh, New Delhi-
110005

3.Lecturer, (Swasthavritta)Babe
ke Ayurvedic College,Daudhar,
Moga, Punjab

Email:drkdmahapatra@gmail.com

A REVIEW ON THERAPEUTIC USES OF CANTELLA ASIATICA (Mandukparni) WITH ITS PHARMACOLOGICAL ACTIONS

ABSTRACT

The drug Cantella had been described by the legends of ancient India. All of them have mentioned Drug as a “Karana” (instrument) among the ten entities which should be very well examined by every physician before proceeding for some action, to get the desired fruit and subsequent benefit in that without any great effort. By this, we can understand that how important it is to know about a drug for performing a research work. Acharya Charaka has later on given the method for its examination, in respect of nature (natural composition), properties, actions, habit, time and mode of collection, storage, processing, dosage, indication for use, the constitution of the patient, and the effect on disorder, whether eliminates it or pacifies it, any other drug of this type should have the same characters. In general, there are various drugs; used in various conditions, in various forms from long time, among them Mandukaparni is one, which is well known for its Medhya property (Increases intelligence). Since long time it has been used traditionally as a remedy for several skin disorders, it is used by the cosmetic industries in preparing skin care products but this aspect is still untouched by Ayuvedic researchers. So in this chapter, we will give the literary description of Mandukaparni so that we can know our drug very well. Miraculous applications in neurology include nerve growth factor enhancement and applications in neurological degenerative conditions.

Key words: Cantella, increases intelligence, cosmetic, miraculous

INTRODUCTION

Taxonomical Classification

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants.
Superdivision	Spermatophyta – Seed plants.
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons.
Subclass	Rosidae
Order	Apiales.
Family	Apiaceae – Carrot family.
Genus	Centella L. – Centella.
Species	asiatica – Spadeleaf.
Latin name	Centella asiatica (L.) Urb.
Synonyms	Centella asiatica Linn., Hydrocotyle asiatica L.

International Vernacular Names

Arabic	- Artaniyaehindi, Jhamiba
Burma	- Minkuabin
Cambodia	- Trachiek kranh
Canarese	- Vondelaga
Dacca	- Bhikapurni
Dutch Indies	- Antanan, Kakikoeda, Pegagan
English	- Indian Pennyort
French	- Bevilaque, Cotylioie asiatique, Hydrocote d'Asia
German	- Wassernabel
Hova	- Loviantsahonantanenty, Raivolesoka
Indo China	- Ban dai uyeh, Rau ma
Kwang Tung	- Loui kongken
Malaya	- Pegaga
Persian	- Sardeturkastan
Philippines	- Rabasa

Sinhalese	- HinCantella
Tagalong	- Taguipuehol, Taguipsoso
Visayana	- Yahonyahon (Indian medicinal plants, Kirtikar & Basu)

Habitat

A prostrate, perennial, faintly aromatic herb (Wealth of India vol.2).It occurs as weed in wet places and along the canal banks, on bare gravelly soil and in grasses, in the opens very common.

Geographical Distribution

The plant is available China, Indonesia, Africa, Australia, Cambodia, Central America, Madagascar, the pacific Islands, USA, Thailand, Southern United States of America and Vietnam , Iran, Pakistan and Sri Lanka and Kambodia. It is especially abundant in the moist areas of India up to an altitude of approximately 600- 800 meters. (WHO monographs on selected medicinal plants vol. 1).

General appearance

It is a trim creeping plant (Indian medicinal plants, Kirtikar & Basu) sending out large runners which produce leaves, roots and fruits at the joints. (Materia medica of India).

Stem

Stem is long horizontal, stoloniferous, filiform often reddish, with long internodes rooting at the nodes. 1-3 leaves arise from each node of the stem (Database on the medicinal plants, vol.1). It is longitudinally wrinkled. (Materia medica of india & their therapeutics).

Roots

Rootstock vertical solid, 3-4 inches long. (The flora of south Indian hill stations vol.1).

Leaves

Leaves 1.3-6.3cm in diameter several from the rootstock which often have much elongated petioles and 1-3 from each node of the stems, orbicular, reniform, rather broader than long, more or less cupped entire or shallow crenate, glabrous on both sides and with numerous slender nerves from a deeply cordate base. (Indian medicinal plants, Kirtikar & Basu)

Petiole

Petioles are very variable in length 7.5-15cm long or more, channeled, glabrous or nearly so. (Indian medicinal plants,Kirtikar & Basu).

Stipules

Short adenate to the petioles forming a sheathing base.

Flowers

Flowers are red, pink or white, in fascicled umbels(Database on medicinal plants used in Ayurveda vol.1) each umbel consisting of 3-4 sessile flowers. (Indian medicinal plants, Kirtikar & Basu).

Calyx

A mere thin nearly truncate ridge at the top of the ovary with five minute triangular teeth. (Pharmacognosy of ayurvedic drugs, kerala.)

Corolla

Corolla of five, free small pinkish reddish or rarely white ovate obtuse or acute entire petals imbricate in bud. (Pharmacognosy of ayurvedic drugs, kerala.)

Stamens

Five epigynous, filaments small free incurved with oblong anthers. (Pharmacognosy of ayurvedic drugs, kerala.)

Pistil

Bicarpellary syncarpous. (Pharmacognosy of ayurvedic drugs, kerala.)

Ovary

Ovary is inferior two locular with one pendulous ovule from the top inner angle of each chamber; the individual carpels oblong, subcylindric curved and slightly compressed with a narrow commisure between the carpels or mericarps. (Pharmacognosy of ayurvedic drugs, kerala.)

Mericarps

4mm. long, longer than broad, ovoid laterally compressed with the pericarp much thickened hard woody reticulose rugose and white with seven to nine subsimilar curvilinear ridges outside and two within the commisure, the secondary ridges being as prominent or distinct as the primary but with no vittae in between. (Pharmacognosy of ayurvedic drugs, kerala.)

Peduncles

Peduncles about ½ inch (The flora of south Indian hill stations vol.1) pubescent or glabrous, short, pink coloured. (Indian medicinal plants, Kirtikar & Basu).

Bracts

Ovate, acute, concave, 2 beneath each umbel. (Indian medicinal plants, Kirtikar & Basu)

Inflorescence

Inflorescence is a simple cyme of the three flowers, a central flower with two bracteoles each of which has a flower in its axil. (An introduction to the taxonomy of angiosperms)

Fruits

Clustered at the joints (Materia medica of India & their therapeutics) 4mm long, longer than broad, ovoid, hard with thickened pericarp, reticulate-rugose, often crowned by the persistent petals, the primary and secondary ridges distinct. (Indian medicinal plants, Kirtikar & Basu) When bruised, the odour is aromatic, taste pungent, nauseous and bitter. (Materia medica of India & their therapeutics)

Seeds

Seeds are laterally compressed. (Pharmacognosy of Ayurvedic Drugs, Kerala)

Flowering and fruiting time

May – October. (Medicinal plants: Ethnobotanical approach, P.C. Tiwari)

Microscopic Characteristics**Leaves**

It has paracytic and diacytic type of stomata on both surfaces (Database on medicinal plants used in Ayurveda vol.1) 30 by 28 μm , mostly rubiaceous type. Palisade cells differentiated into 2 layers of cells 45 by 25 μm ; spongy parenchyma of about 3 layers of cells with many intercellular spaces (WHO monographs on selected medicinal plants). It also contains rosette crystals of calcium oxalate. Midrib region shows 2 or 3 layers of parenchymatous cells without chloroplastids.

Petiole

Petiole shows epidermis with thickened inner walls, collenchyma of 2 to 3 layers of cell, a broad zone of parenchyma, 7 vascular bundles within parenchymatous zone, 2 in projecting arms and 5 forming the central strand; vessels 15-23 μm in diameter. Some parenchymatous cells contain crystals of calcium oxalate. (WHO monographs on selected medicinal plants).

Fruits

Epidermis of polygonal cells, trichomes similar to the leaves, sheets of elongated parquetry layer cells, bundles of narrow annular vessels, and parenchymatous cells contain single large prisms of calcium oxalate. (WHO monographs on selected medicinal plants).

Powder of herb

Green to greenish-brown, shows fragments of epidermal cells polygonal in surface view with stomata, palisade cells, vessels with spiral, reticulate and annular thickening; microsphenoidal and rosette crystals of calcium oxalate; simple, oval to round starch grains measuring 8 to 16 μ in diameter. (Ayurvedic Pharmacopia of India)

Chemical constituents

- ◆ Asiaticoside
- ◆ Alkaloids- Hydrocotylin, Vellarine
- ◆ Madecassoside
- ◆ Triterpene glycoside- Thankuniside
- ◆ Triterpene acid- Thankunic acid
- ◆ Brahmoside
- ◆ Brahminoside
- ◆ Anthrone of Asiaticoside
- ◆ Asiatic acid
- ◆ Madegascaric or madecassic acid
- ◆ Isothankuniside
- ◆ Brahmic acid
- ◆ Centelloside
- ◆ Centic acid
- ◆ Centellic acid centoic acid
- ◆ Indocentoic acid
- ◆ Indocentelloside
- ◆ Isothankuniside
- ◆ Brahmic acid
- ◆ Centelloside
- ◆ Centic acid
- ◆ Centellic acid centoic acid
- ◆ Oligosaccharide- Centellose.(Database on medicinal plants used in Ayurveda-1)
- ◆ Madecassoside : In clinical studies, madecassoside has demonstrated skin healing as well as anti- aging properties in skin. It's thought that it works in several ways including:

- ✓ Controlling inflammation
- ✓ Stimulating the synthesis of collagen I& III
- ✓ Reducing the activity of enzymes (matrix metallo proteins – MMPs) that contribute to the breakdown of the skin's matrix or framework.

Propagation and cultivation

It is propagated from seeds or stolons and can be grown on variety of soils. However moist locations are more suitable. It can be grown in shady places as well. (Database on medicinal plants used in Ayurveda vol.1)

Toxicology

Cantella with subcutaneous injection of 40 to 50 mg/kg of asiaticoside was toxic to the mice and rabbits while 25-250 mg/kg resulted in increased bleeding time. An oral dose of 1.2gm/kg was as well tolerated. The topical toxicity of asiaticoside was investigated by the measurement of skin and histological analysis.

Contact dermatitis has been observed due to madecassol. Triterpene glycosides have been identified as having oncogenic activity. Asiaticoside was found to be a weak tumour promoter. (The essential guide to herbal safety)

Adverse effects

In some studies it have been found to cause irritation to the gastric mucus membrane and reflux because of saponins. Some of the sources said that it may produce photosensitization.

Over dosage

The plant properly prepared and administered is a powerful stimulant of the circulatory system, its action chiefly affecting the vessels of skin and mucous membrane. In large doses it is stupefying narcotic, and in some cases produces cephalgia or vertigo with a tendency to coma. (Poisonous plants of India)

Use in pregnancy

There is no evidence of foetal damage found in animal studies.

Use in lactation

It is compatible with breast feeding. (The essential guide to herbal safety)

Uses described in folk medicine

Therapy of albinism, anaemia, asthma, bronchitis, cellulite, cholera, measles, constipation, dermatitis, diarrhoea, dizziness, dysentery, dysmenorrhoea, dysuria, epistaxis, epilepsy, haematemesis, haemorrhoids, hepatitis, hypertension, jaundice, leucorrhoea, nephritis, nervous disorders, neuralgia, rheumatism, smallpox, syphilis, toothache, urethritis, and varices; and as an antipyretic, analgesic, anti-inflammatory, and "brain tonic" agent. Poultices have been used to treat contusions, closed fractures, sprains, and furunculosis. (WHO monographs on selected medicinal plants vol.1)

Safety

Scientists who studied the topical effects of the herb and its active constituents (asiaticoside, asiatic acid and madecassic acid) on guinea pigs, reported that all the materials studied are very weak sensitizers and that the risk of acquiring contact sensitivity to the plant or its constituents is low.

Pharmacological actions

Actions & uses	Indian medicinal plants	Database on medicinal plants	Materia medica	Wealth of india	Ayurvedic encyclopaedia	Poisonous plants of india	WHO monographs on selected plants
Antipyretic	+	+	+		+		
Appetiser	+						
Leukoderma	+						
Anemia	+						
Blood disorders	+	+				+	
Bronchitis	+	+					
Antinflammatory	+	+					
Splenomegaly	+						
Thirst	+						
Asthma	+	+					
Small pox	+						
Insanity	+				+		
Hiccoughs	+	+					
Headache	+						
Syphilis	+	+	+		+	+	
Leprosy	+	+	+	+			

Dysentery	+	+	+				
Snake bite	+						
Skin eruptions	+		+				
Rheumatism					+	+	
Nervousness	+					+	
Nerves disorder		+			+		
Skin disease	+	+	+		+	+	
Tuberculosis				+			
Wound healing							+
Burns							+
Ulcerous skin disease			+				+
Elephantiasis			+		+		
Ozeana			+				
Scrofula			+				
Psoriasis			+		+		
AIDS					+		
Eczema			+		+		
Epilepsy		+			+		
Hair loss					+		
Senility					+		
Tetanus					+		
Laryngitis		+					
Strangury		+					

REFERENCES

1. A New Short Textbook of Psychiatry; Dr. Leenford Rees, Arnold Publication; 1990.
2. Agnipurana; Sharma Sri Ram.
3. Amarkosh with Comm.of Bhanuji Dixit; Nirnhaya Sagar Press, Bombay; 1944.
4. An outline of Medical Physiology; W.B. Saunders Company; 1991.
5. Astanga Hridaya: Murty Prof. K.R.; Krishnadas Academy, Varanasi, 2nd Edition, 1994, Vol. 1-3
6. Astanga Hridaya with the commentary of Sarvanga Sundara of Arun Dutta and Ayurveda Rasayana of Hemadri; Kunte Dr. Anna Moreswar and Shastri Narve Krihna Ramachandra; Krishna Das Academy; Varanasi; 1995.
7. Astanga Hridaya with commentary Ayurveda Rasayana of Hemadri; Vaidya H.P., Choukhamba Orientalia; Varanasi 1982.
8. Astanga Hridaya; Dr. Brahmanada Tripathi; Choukhamba Sanskrit Samsthan, Varanasi, 2003.
9. Bhaisjya Ratnavali; Choukhamba Sanskrit Samsthan, Varanasi, 1961.
10. Bhavaprakash; Choukhamba Sanskrit Samsthan, Varanasi, 1961.
11. Bhela Samhita; Shukla Srigirija Dayala; Chowkhamba Vaidya Bhawan; Varanasi; 1959.
12. Caraka Samhita with commentary Ayurveda Dipika of Chakrapani Dutta, Vaidya Yadavji Trikamji; Choukhamba Sanskrit Samsthan, Varanasi, 1984.
13. Caraka Samhita with commentary Ayurveda Dipika of Chakrapani Dutta & Jalpakalpataru of Gangadhar Roy; Sen C.K. & Co. Calcutta-1955.
14. Cataldo, A., Gasbarro, V., et al., "Effectiveness of the Combination of Alpha Tocopherol, Rutin, Melilotus, and Centella asiatica in The Treatment of Patients With Chronic Venous Insufficiency", *Minerva Cardioangiology*, 2001, Apr; 49(2):159-63
15. Incandela et al., 2001a; Incandela et al., 2001b; Incandela et al., 2001c)
16. Babykutty, S.; Padikkala, J.; Sathiadevan, P. P.; Vijayakurup, V.; Azis, T. K.; Srinivas, P.; Gopala, S. (2008). "Apoptosis induction of Centella asiatica on human breast cancer cells". *African journal of traditional, complementary, and alternative medicines : AJTCAM / African Networks on Ethnomedicines* 6 (1):9-16. PMC 2816528. PMID 20162036.

17. Daniel, M. (2005). Medicinal plants: chemistry and properties. Science Publishers. pp. 225. ISBN 978-1-57808-395-4.
18. Khare, C. P. (2003). Indian Herbal Remedies: Rational Western Therapy, Ayurvedic, and Other Traditional Usage, Botany. Springer. pp. 89. ISBN 978-3-540-01026-5.
19. Mahapatra Das Kousik et al, Study of depression in different manasa prakriti , 2011, page 115-130