



**A CRITICAL REVIEW ON *BIMBI* W.S.R. TO ITS MEDICINAL USES AND
PHARMACOLOGICAL ACTIVITY**

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ABSTRACT

Plants are admirable source of medicine. As the beginning of human civilization plants are used as medicine. *Coccinia indica* or *Bimbi* belongs to the family cucurbitaceae generally known as *Kundru* in *hindi* and Ivy gourd in English. Ivy gourd is extensively used as vegetable and grown widely throughout India subcontinent. Traditionally different parts of this plant are used in folklore medicine for several purposes. The whole plant of *Coccinia indica* having various pharmacological activities like aerial parts have antidiabetic activity, fruits have antibacterial, antitussive and antidiabetic activity, and leaves have antimicrobial, antioxidant, anti-inflammatory, anti hyperlipidemic, hepatoprotective and chemoprotective activity. The present review highlights the *Ayurvedic* literature, traditional uses, phytochemistry and therapeutic benefits of different parts of *Coccinia indica*.

KEYWORDS: *Coccinia indica*, Ivy gourd, Antidiabetic, *Bimbi*.

INTRODUCTION

Coccinia indica (Synonym: *Coccinia grandis*, *Coccinia cordifolia*) family Cucurbitaceae commonly called as *Bimbi* in *Sanskrit* and *Kundru ki bel* in *Hindi*. It is indigenous to Bengal and other parts of India. *Coccinia indica* grows abundantly all over India, tropical Africa, Australia, and Fiji and throughout the oriental countries.^[1] It is a climber, growing all over the temperate region of India. There are 2 varieties available-bitter variety available in the forests and the sweet variety cultivated as vegetable and used for culinary purpose. The plant is a native to African and Asian continent and grows wildly as a weed.^[2] Ivy Gourd is cultivated abundantly in India (Assam, Bihar, Orissa, Maharashtra, Andhra Pradesh, Tamil Nadu) as a vegetable and its wild form is also found in many parts of India. This plant has been wildly used in traditional Indian medicinal system (*Ayurvedic*, *Unani*, *Siddha*).^[3] This well known vegetable plant is described for the treatment of intestinal worms, skin diseases, for inducing emesis and purgation in *Panchakarma* therapy.

Acharya Charak mentioned *Bimbi* (*Coccinia indica*) in *vamnopaga mahakashaya* and in sixteen *moolani dravya* for *vaman karma*.^[4] Every part of this plant is valuable in medicine and various preparations.

It is famous for its hypoglycemic and antidiabetic properties in *Ayurvedic* system of medicine. Other

applications include the therapy of various conditions such as skin diseases and gonorrhoea. *Coccinia indica* also indicated in other condition as stomatitis, indigestion, liver related problem, dysentery, jaundice, blood related disorders, cough and cold, asthma, urinary tract related problem etc.

BOTANICAL CLASSIFICATION^[5]

KINGDOM	Plantae
DIVISION	Magnoliophyta
CLASS	Magnoliopsida
ORDER	Cucurbitales
FAMILY	Cucurbitaceae
GENUS	<i>Coccinia</i>
SPECIES	<i>Indica</i>

SYNONYMS^[6]

Tundikeri / Tundika- The ripened red color of the fruit resembles the color of beak of parrot.

Raktaphala- The ripened fruit is blood red in color.

Oshthopama phala- The color of the ripened fruit resembles red color like that of lips.

Chardini- Juice of the leaves of the bitter variety is emetic.

Other synonyms are: *Vidruma phala*, *Ushnaphala*, *Dantachada*, *Peeluparnika*

VERNACULAR NAMES^[7]*Sanskrit - Tundika, Tundikeri**Hindi - Kundru**English - Ivy-Gourd**Assam- Kawabhatari**Bengal - Bimbu, Telakucha**Gujrat - Kadavighilodi, Ghilodi**Punjab- Kanduri**Tamil- Kovai**Urdu- Kunduru.***AYURVEDIC PROPERTIES^[8]***Rasa (Taste) – Tikta (Bitter)**Guna (Qualities) – Laghu (Light for digestion), Ruksha**(Cause dryness), Teekshna (Strong)**Veerya (Properties) – Ushna (Hot in potency)**Vipaka – Katu (Undergoes Pungent taste after digestion)**Doshakarma – Kaphapittahara (reduces the vitiated kapha and pitta dosha)***USEFUL PART^[9]** – Leaves, Root (Medicinal purpose), Fruit (as vegetable).**DOSAGE^[10]**

Juice: 10-20ml.

Root: 3-6g.

FORMULATION^[11]: *Vastyamayantaka Ghrita.***TAXONOMICAL DESCRIPTION OF *Coccinia indica* W.& A.****A). MACROSCOPIC^[12]**: Perennial, slender, glabrous. It is a creeper.**1. Leaves:** Leaves are 5-10 cm, long and broad, bright green above, paler beneath, studded and sometimes rough with papillae, palmately 5-nerved from a cordate base, often with circular glands between the nerves, obtusely 5-angled or sometimes deeply 5-lobed, the lobes broad, obtuse or acute, apiculate, more or less sinuate toothed, petioles 2-3.2 cm long.**2. Flowers:** Male flowers: Peduncles are 2-3.8cm.long and subfiliform. Calyx-tube is glabrous, broadly campanulate and 4-5 mm. long. Corolla is 2.5 cm. long, veined, pubescent inside and glabrous outside. Female flowers: Peduncles are 1.3-2.5cm. long. Ovary is fusiform, glabrous and slightly ribbed.**3. Fruits:** Fruits are fusiform-ellipsoid, slightly beaked, 2.5-5 by 1.3-2.5 cm. sized, marked when immature with white streaks, bright scarlet when fully ripe.**4. Seeds:** Seeds are obovoid and rounded at the apex, slightly papillose, much compressed and yellowish grey.**5. Roots:** The fresh root is thick, tuberous, long tapering, more or less tortuous with a few fibrous rootlets attached to it. Roots are flexible, soft and break with a fibrous fracture.**B) MICROSCOPIC^[13]****Midrib region:** Microscopical study shown, transverse section passing through midrib protrudes at the lower side and flat at the upper side. Single layered upper and

lower epidermis was observed with straight walls. Epidermis was covered with thick cuticle bearing few short glandular trichomes. Below and upper epidermis single layered palisade cells were observed with spongy mesophyll cells and in between were the xylem and phloem vessels. Xylem and phloem are arranged in ring. Xylem ring present toward the center and is surrounded by phloem ring. Small cholenchymatous patch lied under the upper epidermis and 1-3 layers of well developed collenchymatous cells were on the lower side. Vascular bundles were semicircular, vessels arranged radial rows, bicollateral, three, one centrally located was bigger in size, and two lying under the upper epidermis were smaller in size.

Petiole

Transverse section of petiole shows single layered epidermis, consisting of flattened, elongated cells with covering of cuticle. Under the epidermis 2-5 layered collenchymatous and 2-6 layered circular, thin walled, cholenchymatous cells with intracellular spaces were observed. Bicollateral vascular bundles were arranged in a single ring. some bundles were capped by one or two layered, thick walled, lignified, polygonal pericyclic sclerenchyma. In centre very wide pith was observed which was composed of large parenchymatous cells.

CHEMICAL CONSTITUENTS^[14,15]**Leaves and Stem** - β - Sitosterol, Cephalandrol, Cephalandrine A & B, Heptacosane.**Roots** – Alkaloids- β - Amyrin, β - Sitosterol, Carbonic acid, saponin- Coccinoside, flavonoid- Ombuin 3-o-arabinofuranoside, Lupeol, Resins, Stigmast-7- en- 3- one.**Fruit** - β - Amyrin acetate, β - Sitosterol, β - Carotene, Cucurbitacin B, Lycopene, Lupeol, Taraxerol, Taraxerone.**Seeds** - The seeds contain fat and fixed oil which are mainly esters of linoleic, oleic and palmitic acids.**CLASSICAL REVIEW****Charaka Samhita**- In *vamnopaga mahakashaya* and in 16 *moolini dravya*.**Sushruta Samhita** - *Urdhwabagahara* (group of herbs that are used for inducing vomiting).**Dhanvantari Nighantu** - In *Guduchayadi varga*.**Bhavaprakasha** - In *Shaka varga*.**Kaiyyadeva Nighantu** - In *Aushadhi varga*.**Raj Nighantu** - In *Guduchayadi varga*.**THERAPEUTIC USE OF DIFFERENT PARTS OF COCCINIA INDICA^[16]**

Various parts of the Ivy Gourd plant have been used as traditional medicine in India. The medicinal utilities have been described, especially for leaf, fruit, root and stem.

1. Leaves

- Skin diseases (ring worm, psoriasis itch, pityriasis), skin eruptions of small pox, small lesions of scabies.
- Chronic sinuses.

- Gastro-intestinal disturbance and diseases.
- Alleviate body heat by inducing perspiration in fever.
- Tincture is used internally in gonorrhoea.
- Cure diabetes and intermittent glycosuria.
- Expectorant.
- Gastro-intestinal disturbance and diseases.
- Urinary tract infection and Respiratory tract related trouble.

2. Stem

- Antispasmodic effect.
- Expectorant.
- Useful in Asthma and bronchitis.
- Cure diabetes and intermittent glycosuria.
- Gastro-intestinal disturbance and diseases\
- Skin diseases.
- Urinary tract infection and related troubles.

3. Fruits

- Cures sores on tongue.
- Raw fruit used as vegetable.
- Cure eczema.

4. Root

- Remove pain in joints.
- Aphthous ulcers.
- Wheezing and phlegm.
- Cure diabetes and intermittent glycosuria.
- Skin diseases, skin lesions (Tenia).
- Treats urinary tract infection and related troubles.

PHARMACOLOGICAL STUDIES

Antioxidant activity - The leaves of *Coccinia indica* exhibit antioxidant activity. The ethanolic extract of *Coccinia indica* leaf (CLEt) showed marked reduction in hydroperoxides and thiobarbituric acid reactive substances in rats when given orally for 45 days at a dose of 200mg/kg body weight. The extract also caused a significant increase in superoxide dismutase, reduced glutathione, glutathione peroxidase, glutathione s-transferase and catalase in liver and kidney of diabetic rats. Diabetes is induced by streptozotocin which clearly shows the antioxidant activity of ethanolic extracts of *Coccinia indica* leaf.^[17]

Anti-inflammatory and Analgesic activity The leaves extract (aqueous) of the *Coccinia indica* shows anti-inflammatory and analgesic activity. A study was conducted to estimate both post and pre-treatment anti-inflammatory activities of the fresh leaves of *Coccinia indica* in rats at various dose levels by using the carrageenan- induced paw edema. The extract shows significant analgesic activity as compared to morphine at 300 mg/kg dose, which suggest the involvement of central mechanism. As comparable to paracetamol, the all doses of extract shows with max. effect a significant reduction in Hyperpyrexia in rats. Over all the study established that aqueous extract of *Coccinia indica*

possess marked anti-inflammatory activity, analgesic and antipyretic activity.^[18]

Hepatoprotective activity A study was organized to evaluate the Hepatoprotective activity of diethylether extract of leaves of *Coccinia indica* against liver toxicity induced by carbon tetrachloride in rats. The results provide that at a dose of 400 mg/kg body weight the *Coccinia indica* leaves shows hepatoprotective activity and it was comparable with silymarin a standard hepatoprotective at 125mg/kg body weight.^[19]

Antihyperlipidemic activity The leaves extract (ethanolic) of *Coccinia* exhibit C60-polyphenol significantly decreased Serum triglyceride, glycerol and total cholesterol and in high fat diet (HFD)-fed dyslipidemic hamsters at a dose of 50 mg/kg body weight. According to this study the leaves of *Coccinia* contain polyphenol exhibit marked antidyslipidemic activity.^[20]

Antidiabetic activity A study has been organized to evaluate the antidiabetic activity of methanolic polyherbal extract of *Coccinia indica* leaves in diabetic rats. Diabetic rats in different groups received treatment with two concentrations of the extract (150 and 300 mg/kg, p.o.) with standard drug and saline, under similar conditions When comparable to glibenclamide after 10 days of treatment there is significant reduction of elevated blood sugar level. The results showed that the polyherbal extracts of leaves of *Coccinia indica* shows distinct antidiabetic property.^[21]

Antimicrobial activity The aqueous extracts and organic extracts (petroleum ether and methanol) of fruit of *Coccinia indica* were investigated for antibacterial activity against some pathogenic bacteria. The organic extracts showed the highest activity as comparison to aqueous extracts against the bacteria. The antimicrobial activity is due to the phytoconstituent like alkaloids, tannins, saponins, flavonoids, glycoside and phenols.^[22]

Antitussive activity Methanolic extract of fruits of *Coccinia* exhibit marked antitussive activity. As compared to codeine phosphate the extract shows marked antitussive effect at a dose of 100,200 and 400 mg/kg, p.o in Sprague dawley rats within 90 min of performing the experiment. The extract might be acting via the Central nervous system.^[23]

Chemoprotective activity The chemoprotective activity of *Coccinia indica* genotoxicity, hepatotoxicity and oxidative stress induced by cyclophosphamide was carry out in 2013 by Nitharwal and co-workers. In this study rodents were orally pre-treated with *Coccinia indica* extract (200, 400 and 600mg/kg) for five consecutive days. *Coccinia indica* extract marked reduced the MDA level and increased glutathione level in the brain. It also significantly reduced the increased Serum biomarker enzymes like Aspartase aminotransferase and alkaline

aminotransferase indicating the protective effect of *Coccinia indica* extract against genotoxicity, oxidative stress as well as hepatotoxicity induced by cyclophosphamide.^[24]

Antiulcerogenic activity The effect of methanol and aqueous extract of *Coccinia*, leaves on gastric ulcer induced by aspirin in rats were investigated. The leaf powder showed marked increase in mucus secretion with marked decrease in ulcer index and decrease in level of SOD and LPO activity. At equivalent dose to that of the powder the methanol extract also showed marked changes in mucus secretion, LPO, SOD with marked decrease in ulcer index as comparison to Famotidine (std. drug) receiving group which showed no effect on the mucus secretion. The result showed that the *Coccinia indica* possess antiulcerogenic activity due to increase mucus secretion and antioxidant action.^[25]

CONCLUSION

From this study, it is clear that *Coccinia indica* play an important role in various disease and used to cure many ailments. Plant extracts have significant analgesic, antipyretic, anti-inflammatory, antimicrobial, antiulcer, antidiabetic, antioxidant, hypoglycemic, hepatoprotective, antimalarial, antidyslipidemic, anticancer, antitussive, mutagenic activity in different animal models. Various phytoconstituents reported in *Coccinia indica* are cephalandrol, tritriacontane lupeol, b-sitosterol, cephalandrine A, cephalandrine B, stigma-7-en-3-one, taraxerone and taraxerol, flavonoids, saponins, glycosides etc which are responsible for its pharmacological activities. So further studies are required to investigate and to determine the role of *Coccinia indica* in management of different diseases.

REFERENCE

1. Council of Scientific & Industrial Research. Wealth of India: A dictionary of Indian raw materials and industrial products. Raw material, New Delhi: Council of Scientific & Industrial Research, 1992; 312.
2. <https://easyayurveda.com/2016/09/19/ivy-gourd-benefits-ayurveda-usage-remedies-research-side-effects/>.
3. Publication Ref No.: IJPRD/2010/PUB/ARTI/VOV-2/ISSUE-9/NOV/014 ISSN 0974 – 9446 MEDICAL PROPERTIES OF IVY GOURD (CEPHALANDRA INDICA): A REVIEW. Goldy Yadav, Amit Mishra, Archana Tiwari.
4. Acharya Agnivesh, Charak Samhita, Chaukhamba Bharti Academy, Varanasi. Reprint year: 2009. vol- I sutra sthan 4/23, p. 85 and 1/79, p.43.
5. *Coccinia indica*, Kundru Herb, Benefits, Information. www.ayurveda.com/herbs/coccinia-indica.htm.
6. Namarupajnanam, author Priyavrat Sharma, publisher- Chaukhamba vishvabharti. Reprint year 2015; 141.
7. Government of India, Ministry of Health and Family Welfare, Department of Ayush. The Ayurvedic pharmacopoeia of India. Vol III rd, Part- I. New Delhi: Government of India, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, 2007; 80-88.
8. Dravyagun vijyan vol. IInd writer- Acharya Priyavrat Sharma, Chaukhamba Bharti academy, reprint, 2006; 688.
9. Dravyagun vijyan vol. IInd writer- Acharya Priyavrat Sharma, Chaukhamba Bharti academy, reprint, 2006; 689.
10. Bhavaprakash nighantu commentary by Proff. K.C.Chunekar edited by Late Dr G.S.Pandey, Chaukhamba Bharti Academy Varanashi, reprint year 2013.
11. Government of India, Ministry of Health and Family Welfare, Department of Ayush. The Ayurvedic pharmacopoeia of India. Vol III rd, Part- I. New Delhi: Government of India, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, 2007.
12. Indian Medicinal Plants, Kirtikar, K.R., & Basu, B.D. volume ii, 1152.
13. Arshad Hussain, Shadma Wahab: Macroscopic, anatomical and physico-chemical studies on leaves of *Coccinia indica*, growing wild in eastern UP region of India. Indian journal of natural products and resources, 2(1).
14. Gill N. S., Kaur P., and Arora R. Review on *Coccinia cordifolia* auct. Non (l.) Cogn. International Journal of Advances in Pharmaceutical, 2014; 5(4): 234–241.
15. Pekamwar SS, Kalyankar TM and Kokate SS. (Pharmacological Activities of *Coccinia grandis*: Review). J App Pharm Sci, 2013; 3(05): 114-9.
16. Goldy Yadav, Amit Mishra, Archana Tiwari: MEDICAL PROPERTIES OF IVY GOURD (CEPHALANDRA INDICA): A REVIEW. Publication Ref No.: IJPRD/2010/PUB/ARTI/VOV-2/ISSUE-9/NOV/014, ISSN 0974 – 9446.
17. Venkateswaran S and Pari L. “Effect of *Coccinia indica* leaves on antioxidant status in streptozotocin-induced diabetic rats” Journal of ethnopharmacology, 2003; 84(2-3): 163-8.
18. Niazi J, Singh P, Bansal Y, Goel RK. Antiinflammatory, analgesic and antipyretic activity of aqueous extract of fresh leaves of *Coccinia indica*. Inflammopharmacology, 2009; 17(4): 239-44.
19. Shyam BK, Gnanasekaran D, Jaishree V, Channabasavaraj KP. Hepatoprotective activity of *Coccinia indica* leaves extract. Int J Pharm Biomed Res., 2010; 1(4): 154-156.
20. Singh G, Gupta P, Rawat P, Puri A, Bhatia G, Maurya R. Antidyslipidemic activity of polyphenol from *Coccinia grandis* in high-fat diet-fed hamster model. Phytomedicine, 2007; 14: 792-798.

21. Ghosh S and Roy T. Evaluation of antidiabetic potential of methanolic extract of *Coccinia indica* leaves in streptozotocin induced diabetic rats. *IJPSR*, 2013; 4(11): 4325-4328.
22. Shaheen SZ, Bolla K, Vasu K, Singara Charya MA. Antimicrobial activity of the fruit extracts of *Coccinia indica*. *Afr J Biotechnol*, 2009; 8(24): 7073-7076.
23. Pattanayak SP, Sunita P. In vivo antitussive activity of *Coccinia grandis* against irritant aerosol and sulfur dioxide-induced cough model in rodents. *Bangladesh J Pharmacol*, 2009; 4: 84-87.
24. Nitharwal RK, Patel H, Karchuli MS, Ugale RR. Chemoprotective potential of *Coccinia indica* against cyclophosphamide -induced toxicity. *Indian J Pharmacol*, 2013; 45(5): 502–507.
25. Mazumdar P.M, D Sasmal, Antiulcerogenic and antioxidant effects of *Coccinia grandis* (Linn)Voigt leaves on aspirin-induced gastric ulcer in rats, *Natural product sciences*, 2008; 7(1): 15-18.