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**COCCINIA GRANDIS L. VOIGT (BIMBI): A REVIEW**

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ABSTRACT:

Bimbi (Coccinia grandis L. Voigt) is extensively used as vegetable and grown wildly throughout Indian subcontinent. It is commonly known as 'Kundru' in India. In English it is known as Ivy Gourd. Coccinia grandis belongs to the family Cucurbitaceae. It is a rapidly growing, perennial climber or trailing vine. Ivy plant has been used in traditional medicine as a household remedy for various diseases like diabetes, jaundice, fever, Asthma, cough, Anti-inflammatory, antioxidant, anti-mutagenic, anti-diabetic, antibacterial, anti-protozoal, antiulcer, hepato-protective, expactorants, analgesis, anti-inflammatory are the reported pharmacological activities of Ivy Gourd. This review provides adequate information to develop suitable therapeutics out of this part of plants.

KEYWORDS: *Bimbi, Coccinia grandis L. Voigt, Medicinal plant, Dravyaguna*

INTRODUCTION**CORRESPONDANT:**

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Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. The widespread use of herbal remedies and healthcare preparation has been traced to the occurrence of natural products with medicinal properties. The history of material medica of Ayurveda is as old as the Vedas. The *Rigveda* (prior to 4500 B.C.), which is the

oldest repository of human knowledge has described about 67 plants.¹ *Coccinia grandis* L. Voigt (Bimbi) is one such medicinal plant explained in Indian material medica (*Dravyaguna* Sastra.) The fruit of *Coccinia grandis* L. Voigt is used as vegetable when green and eaten fresh. Each part of this plant is valuable in medicine and various preparations have been mentioned in indigenous system of medicine for various disorders. In Ayurveda, *Coccinia grandis* L. Voigt has been well documented for its therapeutic potentials and described in *Vamanopaga dashemani* and *urdhvabhagahara* varga.²

HISTORY

There has been confusion regarding the plant's origin in Australia. Some early literature states that it is native to Australia (e.g. Hnatiuk 1990). Mitchell (pers. comm.) suggests it might have been introduced by humans prior to European settlement of Australia, along Indonesian fishing routes, to the isolated coastal regions of the Northern Territory, where it now occupies remnant vine forests. The Queensland Herbarium currently lists this species as 'naturalized' (not native).³ *C. grandis* is recorded as an invasive weed in Saipan, Fiji, Guam, Hawaii, Solomon Islands and Tongatapu Island (PIER 2003). In Hawaii, it is listed in legislation as a noxious weed. In Hawaii, PIER (2003) commented that it is 'naturalized

and rapidly spreading in disturbed sites, 0–100 m' and that 'it is a severe pest in gardens, on utility poles, roadsides, and in natural areas'. In Fiji, it is 'a naturalised weed of waste places, cane fields and roadsides near sea-level' (PIER 2003).⁴

VERNACULAR NAMES OF BIMBI^{5, 6, 7}

Arabi- Kabare
 Persian- Kabare
 Canarian- Goraph- phla –lata
 Burmese -Kenbh-oun-bin
 Bengali -Tela kucha, Bimbu
 Bihari -Thirkola
 Gujarati- Tidora, Giloda
 Hindi- Bimbi, Kanturi, kundaru, kanduri
 English -Ivy guard
 Kannada -Tondekayi
 Kokani -Pendil, Tendulem, Tendil
 Marathi -Tendil, Zidadi, Tondali
 Panjabi -Kanduri, Ghol, kundru
 Oriya -Kainchi kakudi, Bano kundri
 Sanskrit -Bimbi
 Telagu -Donda tige, Kaya
 Urdu- Kunduru
 Tamil- Kovai, Kovaikai
 Malayam -Koval , Kova , Nallakova

TAXONOMICAL IDENTIFICATION⁸

Kingdom- Plantae
Division – Magnoliophyta
Class – Magnoliopsida
Order – Cucurbitales
Family- Cucurbitaceae
Genus – *Coccinia*

Species – Grandis

Botanical name – *Coccinia*

Grandis

TABLE NO 1 :Synonyms of *Bimbi* According To Different Views⁹⁻¹⁷

Sl.no	Synonyms	Ch sam	Su sam	As .H	K.N.	D.N.	Bh. P	R.N.	Sho. N.	P.N.	M.N.
1	<i>Tundikeri</i>	-	-	-	+	+	+	-	-	-	-
2	<i>Austhopamaphala</i>	-	-	-	-	+	+	-	-	-	-
3	<i>Tundika</i>	-	-	-	+	+	-	-	-	-	-
4	<i>Bimbi</i>	+	+	+	-	+	+	+	+	+	+
5	<i>Golha</i>	-	-	-	+	+	-	-	-	-	-
6	<i>Raktaphala</i>	-	-	-	+	+	+	-	-	-	-
7	<i>Vidrumphala</i>	-	-	-	+	-	-	-	-	-	-
8	<i>Usns phala</i>	-	-	-	+	-	-	-	-	-	-
9	<i>Vidrumpaki</i>	-	-	-	+	-	-	-	-	-	-
10	<i>Dantachada</i>	-	-	-	+	-	-	-	-	-	-
11	<i>Tundi</i>	-	-	-	+	+	+	-	-	-	-
12	<i>Tundikephala</i>	-	-	-	+	+	-	-	-	-	-
13	<i>Piluparni</i>	-	-	-	+	+	-	-	-	-	-
14	<i>Utrunduki</i>	+	+	+	-	-	-	-	-	-	-
15	<i>Bimbika</i>	-	-	-	+	-	+	-	-	-	-

TABLE NO 2: *Rasapanchaka* And *Doshagnata* According To Various Authors⁹⁻¹⁷

Text	Rasa	Guna	Veerya	Vipaka	Doshagnata
C.S	Madhura, Kashaya	-	Sheeta	-	Pitta, Kapha
S.S	Kashaya	-	-	-	-
A.S	Madhura	-	-	-	-
A.H	Madhura	-	-	-	-
D.N	-	-	-	-	Vata pitta
M.N	Madhura	Guru	Sheeta	-	Pitta
K.N	Madhura	Guru	Sheeta	Madhura	Vata kapha
Bh.N	Madhura	Guru	Sheeta	Madhura	Vata pitta
R.N	Katu- Tikta	-	-	-	Pitta kapha

[C.S- *Charaka Samhita*, S.S- *Sushruta Samhita*, A.H- *Ashtanga Hridaya*, A.S - *Ashtanga Samgraha*, D.N- *Dhanvantari Nigantu* M.N- *Madanpala Nigantu*, K.N- *Kaiyadeva Nigantu*, Bh.N- *Bhavprakash Nigantu*, R.N- *Raj Nigantu*]

INDICATION IN DIFFERENT AYURVEDIC TEXTS ¹⁸

Lock jaw – Ripe fruit of bimbi along with jaggery should be put in mouth and the jaw should be set in position followed by oleation and fomentation. (BS, *Vatavyadhi*.101)

Worms – Intake of bimbi ghrita destroys worms located in gastro-intestinal tract. (GN.2.6.41)

Wound - Leaf juice is useful in wound. (PVS)

Mouth ulcer - Dried fruit is used in Mouth ulcer for chewing.(PVS)

Madhumeha - Mula or leaf juice is useful in Madhumeha.(PVS)

[BS- *Bhel Samhita* GN- *Gadanigraha* PVS- *Priyavta Sharma*]

CHEMICAL CONSTITUENTS¹⁹

Bimbi contains Coumarin ,carbohydrates, glycosides, fix oils and fats, proteins and amino acids ,saponins ,tannins, phytosterol , alkaloids , phenolic , steroids, saponins, ellagic acid, lignin's, triterpenoids, tannins,

flavonoids, glycosides, phenols phytosterol, Triterpenes cephalandrol, tritriacontane, lupeol, b-sitosterol, cephalandrine A, cephalandrine B, stigma-7-en-3-one, taraxerone and taraxerol.

PHARMACOLOGICAL ACTIVITY

ANTIBACTERIAL ACTIVITY

It has been reported by A. Sivaraj et al. that ethanol leaf extract of *Coccinia grandis* showed high antibacterial activity against *S.aureus*, *B.cereus*, *E.coli*, *K.pneumoniae* and *S.pyogens*. The hexane leaf extracts showed high antibacterial activity against *B.cereus*, *E.coli*, *K.pneumoniae* and *S.pyogens*. Whereas, acetone, methanol and aqueous extracts showed intermediate activity against *S.aureus*, *B.cereus*, *E.coli*, *K.pneumoniae* and *S.pyogens*.²⁰

Umbreen Farrukh et al. reported Water extracts of leaves and ethanol extract of stem showed high activity against *Shigella boydii* and *Pseudomonas aeruginosa* respectively which is equivalent to the reference drugs. Water extract of leaves showed moderate activity against *Salmonella typhi*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*, whereas hexane extract of leaves were moderately active against all gram positive and negative bacteria except *Proteus mirabilis* which showed no activity. Water fraction of *Coccinia grandis* stem showed

activity against *Shigella boydii* only whereas hexane extract was moderately active against *Streptococcus pyogenes*, *Salmonella typhi*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Shigella boydii*. Ethyl Acetate fraction of stem also showed moderate activities against all bacteria except *Staphylococcus aureus*, *Proteus mirabilis* and ethanol extract showed good activity against all organisms except *Klebsiella pneumoniae* and *Proteus mirabilis*.²¹

ANTI-INFLAMMATORY ACTIVITY

S.V Deshpande et al. reported Aqueous extract of leaves of the plant material showed more or less significant inhibition of formaldehyde induced edema in early phases while significant inhibition at later phases. Aqueous extract of leaves showed more significant percentage inhibition of paw edema than aqueous extract of stem and indomethacin. Acute inflammation induced by formaldehyde results from cell damage, which provokes the production of endogenous mediators, such as, histamine, serotonin, prostaglandins, and bradykinin. Arthritis induced by formalin is a model used for the evaluation of an agent with probable antiproliferative activity. As some of the above fractions significantly inhibited this model of inflammation they can be thought to possess antiproliferative and antiarthritic activities similar to

indomethacine, a cyclooxygenase inhibitor.²²

ANTIMICROBIAL ACTIVITY

It has been experimentally proved that crude powder from Aqueous, acetone and ethanol extracts of leaves shows antimicrobial activity *C. grandis* is a widespread medicinal plant traditionally used in India to treat infectious diseases. Aqueous, acetone and ethanol extracts of leaves of *C. grandis* showed for antimicrobial activity in vitro by the agar well diffusion method. Ethanol extract of leaves exhibited antimicrobial activity against biofilm producing strains Uropathogenic *Escherichia coli* (UPEC) 17 and 82, whereas the aqueous and acetone extracts showed antibacterial activity only against UPEC 57. Ethanol extract of leaves exhibited inhibitory action against ESBL producing UPEC 87 and 96, whereas the aqueous extract inhibited the growth of only UPEC 85. Similarly, the acetone extract inhibited the growth of UPEC 42 and 96. These antimicrobial properties seem to be related to the presence of tannin, alkaloids and tri-terpenoids in *C. grandis*.²³

HEPATOPROTECTIVE ACTIVITY

The therapeutic efficacy of *C. grandis* needs critical evaluation because there are many reports that the extract of this plant affects liver. The effect of ethanol extract of *C. grandis* at 150 mg/kg and 300 mg/kg doses reduced the serum activities caused

by Paracetamol and CCl₄, which were observed to be statistically significant when compared with that of the standard hepatoprotective drug, Silymarin. Silymarin provided a better inhibition or exhibition of the biochemical parameters induced by paracetamol and carbon tetrachloride in rats. The activity may be due to the presence of either alkaloids or triterpenoids or reducing sugars or their combinations, as obtained from the preliminary phytochemical screening of the leaves of the plant. The extract showed no signs of acute toxicity up to a dose level of 3.2 gkg⁻¹ in rats by oral route. Thus, author concluded that ethanolic extract of *C. grandis* leaves possessed significant hepatoprotective activity.²⁴ In another study It has been reported by Sunilson JAJ et al. that the ethanolic extract at an oral dose of 200mg/kg exhibited a significant (p<0.05) protective effect as shown by lowering serum levels of glutamic oxaloacetic transaminase, glutamic pyruvic transaminase, alkaline phosphatase total bilirubin and total cholesterol and increased level of total protine and albumin levels as compared to sylimarine, the positive control.the activity may due to the presence of flavanoid compounds. The extracts showed no signs of acute toxicity up to a dose level of 2000mg/kg. thus it is opined by author that ethanolic extract of *coccinia grandis* leaves possesses significant hepatoprotective activity.²⁵

ANTI OXIDANT ACTIVITY

All the fractions of *C. grandis* decreased the amount of nitrite generated from the decomposition of sodium nitroprusside in vitro. This may be due to the antioxidant principles in the fractions. The results of this study express that the fractions have an effective capacity for iron binding, suggesting its antioxidant potential. In addition, the metal chelating ability of the fractions demonstrated that they reduce the concentration of the catalysing transition metal involved in the peroxidation of lipids. The presence of high phenolic and flavonoid content in the fractions has contributed directly to the antioxidant activity by neutralizing the free radicals.²⁶ The antioxidant property depends upon concentration and increased with increasing amount of the fractions. The free radical scavenging and antioxidant activities may be attributed to the presence of flavonoids present in the fractions.²⁷

ANTI-HYPERGLYCEMIC EFFECT

Herbal drugs provide a potential source of hypoglycemic drugs because many plants and plant derived compounds have been used in the treatment of diabetes.²⁸ As I have done a pilot study on root powder of Bimbi I found that Bimbi exhibited anti-hyperglycemic activity in diabetic patients. Root powder mimic insulin like activity and improved the

functional status of enzymes in glycolytic pathway and polypolytic pathway.²⁹

ANTI TUSSIVE ACTIVITY

Pattanayak SP et al. (2009) reported significant reduction of cough number obtained in the presence of both concentrations of methanol extract as that of the prototype antitussive agent codeine phosphate. Also, methanol extract exhibited significant antitussive effect at 100, 200 and 400 mg/kg, per orally by

inhibiting the cough by 20.57, 33.73 and 56.71% within 90 min of performing the experiment respectively. The antitussive activity of methanol extract has been compared with that of codeine against coughing-induced in two different animal species by chemicals stimulation (irritant citric acid aerosol and sulphur dioxide gas) stimulation. The extracts showed marked antitussive effect.³⁰

CONCLUSION

In this review we summaries the phytochemicals constituents and medicinal activities of Ivy Gourd Generally the fruit of Bimbi (Ivy Gourd) is used as vegetable in all over India but only few people are aware of its therapeutic properties. It has been proved beneficial in treating Anti-inflammatory, Anti-allergic, Anti-oxidant,

Anti-hyperglycaemic and Anti-cancer properties. Till date many researches has been carried out on the medicinal effects of Bimbi; this review will give a new impetus to utilise Bimbi in various disorders.

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