

The Journal of Phytopharmacology

(Pharmacognosy and phytomedicine Research)

Review Article

ISSN 2320-480X

JPHYTO 2022; 11(3): 211-216

May- June

Received: 26-02-2022

Accepted: 15-04-2022

©2022, All rights reserved

doi: 10.31254/phyto.2022.11313

Padma R

Associate Scientific Writer, Indegene Pvt Limited, Bengaluru, Karnataka, India

Vinoth Kumar G

Research Scientist & Head, Department of Medical Research, Dr. V Balaji Dr. V Seshiah Diabetes Care and Research Institute, Aminjikarai – 600 030, Chennai, India

Correspondence:

Dr. Vinoth Kumar G

Research Scientist & Head, Department of Medical Research, Dr. V Balaji Dr. V Seshiah Diabetes Care and Research Institute, Aminjikarai – 600 030, Chennai, India

Email:

vinothkumarbiochem@gmail.com

Coccinia indica: A Comprehensive Review of Pharmacology, Therapeutic Applications, Nutritional Potentials, and Future Prospects

Padma R, Vinoth Kumar G*

ABSTRACT

The pharmacognosy, phytochemistry, nutritional value, and ethnopharmacological activity of *Coccinia indica* (*C. indica*) are discussed in this review. Many patented compositions generated from *C. indica* are now widely available around the world. This has resulted in a rise in research on the phytochemical elements of *C. indica* as well as ethnopharmacological activities. This belongs to the Cucurbitaceae family. Indigenous peoples used several portions of the plant for food and medicine. When the fruit of *C. indica* is green in colour, it is used as a vegetable, and when it ripens into a beautiful scarlet hue, it is eaten fresh. *C. indica*'s young leaves and branch tips are frequently utilised in traditional medical systems in Asia, including Ayurvedic, Siddha, and Unani. Traditionally, different parts of this plant used in folk medicine for many purposes, such as anti-diabetic, antimicrobial, anti-inflammatory, antioxidant, antimalarial, antidyslipidemic, anticancer, analgesic, antipyretic, antitussive, antinociceptive, hepatoprotective, ant obesity, and neuroprotective function. Many traditional medicines are made from medicinal plants, minerals, and organic materials, which is why this review is focused on that particular plant. The utilisation of numerous medicinal plants from the traditional medicine system for the treatment of various ailments has sparked increasing interest in recent years. Traditional medicine has employed *C. indica* as a home treatment for a variety of diseases.

Keywords: *Coccinia indica*; Pharmacognosy; Phytochemistry; Nutrition; Ethnopharmacology.

INTRODUCTION

Botanical Description of *Coccinia indica*

C. indica is in the *Cucurbitaceae* (pumpkin) family of tropical plants. *C. indica* is an aggressive vine that can spread rapidly across trees, shrubs, fences and other supports. It is an outdoor plant, but it is preferred to have a sunny sheltered location and a sandy earth. As a perennial plant, it may spread vegetation or seeds. The stem is a herbaceous climber with sometimes adventitious roots forming along the ground where the stem runs, or a perennial slender climber. The tendrils are long, elastic and have a springy, coil-like character that can curl up around the host for the entire length. With five lobes, the leaves are known as palmately plain, while the shape varies from the heart to the pentagon. The width and length of the leaves is approximately 5 to 10 cm. The flower is about 4 cm in diameter, wide and white, and contains five slender, tubular petals. The berry type belongs to the *C. indica* fruit: oval and hairless with thick, sticky skin. The raw fruit is green in colour and, when mature, becomes bright red. The ripe fruit is typically 15-35 mm in diameter and is 25 to 60 mm long and contains many pales, flattened seeds [1,2]. The seeds are obovoid, slightly papillary, very compressed and yellowish-Gray, and rounded at the apex. The fresh root is dense, tuberous, tapering, with a few fibrous rootlets attached to it, more or less tortuous. Roots with a fibrous fracture are flexible, soft, and split. A root transverse section displays a circular outline and is unique to the form of storage. Parenchyma is full of starch grains and it is observed to deeply permeate parenchyma with vascular elements. The cork is made of cell rows [3]. Indigenous peoples used several portions of the plant for food and medicine. When the fruit of *C. indica* is green in colour, it is used as a vegetable, and when it ripens into a beautiful scarlet hue, it is eaten fresh. In Asia, the young leaves and shoot tips of *C. indica* are used in cooking.

Nutritional Value of *Coccinia indica*

Aside from their delectable flavor, *C. indica* is a healthy source of vitamins, minerals, and nutrients. 100 grams of *C. indica* provide 1.4 milligrams of iron, 0.08 milligrams of Vitamin B2, 0.07 milligrams of Vitamin B1, 1.6 grams of total dietary fibre, and 40 milligrams of Calcium. Thiamine supports in the conversion of carbohydrates into glucose, which is the body's preferred source of energy for maintaining

metabolism running smoothly. It also supports in the digestion of proteins and fats. Thiamine is transported in the blood and plasma after consuming *C. indica* and then used by the cells to transform energy. Vitamin B1 is present in 0.07 milligrams in *C. indica*, which is 15.83 percent of the daily recommended dose. Thiamine, which is present in *C. indica*, is also essential for the production of red blood cells, which provide constant energy. Since thiamine and other B vitamins are naturally energy boosters and are necessary to create ATP from foods, B Vitamin Complex supplements are often categorized as energy boosters or healthy metabolism products. Patients are also given *C. indica* as a supplement to help correct metabolic disorders associated with genetic diseases [4].

Preparation and Dosage

C. indica supplements are available online as well as in several natural food retailers and dietary supplement stores. The majority of *C. indica* supplements come in tablet or capsule form, with doses ranging from 250 mg to 400 mg. *C. indica* tinctures are available in glass dropper bottles, as well as crude unfiltered extracts in larger (usually 32-ounce) bottles. There are no rules for using *C. indica* in a proper manner. Although some studies have used as little as 1 gram a day for 90 days [5], there is no proof that higher doses are more effective than lower doses. Most manufacturers recommend a daily dose of 400 mg to 500 mg, taken with or without food. Do not exceed the prescribed dose on the product label, regardless of the type our use. This does not mean that the product is safe or successful, but it can help you avoid unpleasant side effects. *C. indica* supplements should be kept in a cool, dry place. Never take a supplement until it has passed its expiration date.

Table 1: Major Nutrients of *Coccinia indica* Quantity of Servings: 100 grams

Major Nutrients	Quantity	Values in % per day
Water	93.5 ml	Not Defined
Energy	75 kJ	
Protein	1,200 mg	2.40 %
Total Fat	100 mg	0.29 %
Carbohydrate	3,100 mg	2.38 %
Dietary Fiber in Total	1,600 mg	4.21 %
Iron	1.4 mg	17.50 %
Calcium	40 mg	4.00 %
Potassium	30 mg	0.64 %
Vitamins B1	70 µg	5.83 %
Vitamins B2	80 µg	6.15 %
Vitamins B3	70 µg	0.44 %
Vitamins C	1400 µg	1.56 %

*The values listed have been recommended by the United States Department of Agriculture. The calculations are based on a person who is 19 to 50 years old and weighs 88 kilograms [4]

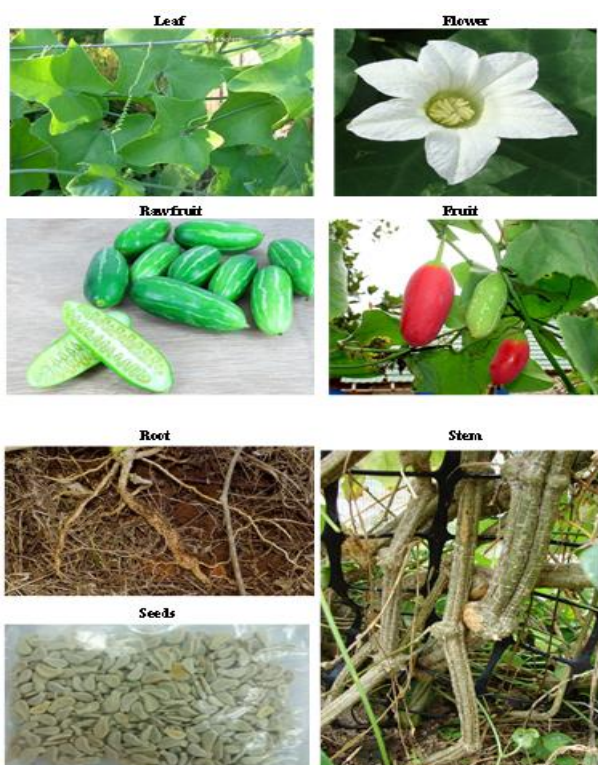


Figure1: Different parts of *Coccinia indica*

Phytochemical Constituents

C. indica is high in β-carotene, complex carbohydrates, fibre, and a wide range of B vitamins and minerals. It's also a good nutrient source. Several important phytochemical elements have been found in various parts of the *C. indica* plant. The roots of *C. indica* are known to contain active constituents like “Flavonoid glycoside imbuing 3-oarabinofuranoside Triterpenoid, saponin locundioside – k (i). C41H66O12; Stigmast-7-en-3-one Lupeol, β- amyryn and β-sitosterol” [6-8]. Apart from alkaloids, carbohydrates, proteins and amino acids, tannin, saponins, flavonoids, phytosterol, and triterpenes, anthraquinones were found in the aqueous extract of fresh leaves of *C. indica*. Cephalandrol A and B, sigma-7-en-3-one, taraxerone, and taraxerol are some of the compounds found in Cephalandrol A and B [9]. The fruits of *C. indica* are known to contain active constituents like “Taraxerone, taraxerol, and (24R)-24- wholeholes- 5- en- 3β- ol glucoside. β- Carotene, lycopene, cryptoxanthin, and apo- 6'- lycopene. β- sitosterol and taraxerol” [10]. The study showed that whole plant of *C. indica* mainly contains “Aspartic acid, Glutamic Acid, Asparagine, Tyrosine, Histidine, Phenylalanine and Threonine Valine Arginine” [11].

Table 2: Major phytochemical compounds present in *Coccinia indica* [6-11]

Name of the constituents	Chemical structure	Name of the constituents	Chemical structure
Aspartic acid		Taraxerol	
Glutamic Acid		β- amyrin	
Asparagine		β- sitosterol	
Tyrosine		Cryptoxanthin	
Taraxerone		Palmitic acid	$\text{CH}_3(\text{CH}_2)_{13}\text{CH}_2\text{COOH}$
β- Carotene		Lenoleic acid	
Lycopene		Histidine	

Reported Ethnopharmacological Activity of *Coccinia indica*

Anti-Diabetic Activity

Plants from the *C. indica* genus, or extracts from them, may play a role in diabetes treatment. Bioactivity-driven fractionation was used to create quercetin, a bio flavonoid that was isolated for the first time

from *C. indica* aerial parts. In the oral glucose tolerance test, Quercetin considerably reduced glucose levels in type 2 diabetic rats, whereas it had no hypoglycemic effects in normal rats. Quercetin enhanced HDL-cholesterol levels in insulin and serum, as well as β-cell function [12]. After 45 days of oral treatment of 200 mg/kg ethanol extract of *C. indica* leaves to diabetic animals, blood glucose, glycosylated hemoglobin, total hemoglobin, and plasma insulin levels all decreased significantly. Normal, diabetic, diabetic rats treated

separately with *C. indica* and glipalamide leaves, and diabetic rats treated separately with *C. indica* and glipalamide leaves had their liver activity of hexokinase, glucose-6-phosphatase, fructose-1, 6-bisphosphatase, and glucose-6-phosphate dehydrogenase, a lipogenic enzyme, measured. The activity of the lipogenic enzyme and hexokinase in the diabetic liver was significantly reduced, whilst the activity of the gluconeogenic enzymes rose significantly. Glipalamide and *C. indica* leaves were both able to bring the altered enzyme activity back to near-control levels. *C. indica* leaves were more effective than glipalamide^[13].

A double-blind, placebo-controlled, randomized experiment was carried out by Kurian *et al.*, (2008)^[15]. For 90 days, 60 type 2 diabetes participants were randomly assigned to either the placebo or experimental groups and given 1 g of alcoholic extract of *C. indica*. When compared to the placebo group, the experimental group had significantly lower fasting, postprandial blood glucose, and A1C levels. Gunasinghe *et al.* (2011)^[14], performed a phase I clinical trial that was double-blind. For breakfast, 61 healthy volunteers were given a meal containing 20 g of *C. indica* leaves, scraped coconut, and table salt, whereas another 61 were given a placebo meal including scraped coconut and salt. Both groups underwent a blind glucose tolerance test. Blood sugar levels in the study group were likewise significantly lower than in the control group.

Antimicrobial and Malarial Activity

Antimicrobial efficacy of *C. indica* bioactive substances against pathogenic microorganisms was examined. The agar well diffusion method and the broth dilution method were used to evaluate the aqueous and organic solvent extracts from the leaves of *C. indica* against "*Enterobacter aerogenes*, *Pseudomonas aeruginosa*, *Staphylococcus epidermidis*, *Bacillus subtilis*, and *Salmonella typhimurium*". In contrast to the other extracts, the findings showed that ethanol and aqueous extracts had a more potent inhibitory effect. This illustrates the ability of plant extracts for human treatment of different skin and gastrointestinal infections^[15]. Sivaraj *et al.*, (2011)^[16] studies have shown that ethanol leaf extract of *C. indica* high antibacterial activity against "*S. aureus*, *B. cereus*, *E. coli*, *K. pneumoniae* and *S. pyogenes*". The antifungal activity of the extract of *C. indica* leaves against "*Candida albicans-II*, *Candida tropicalis*, *Aspergillus Niger*, *Saccharomyces cerevisiae*, *Candida tropicalis II*, *Cryptococcus neoformans* and *Candida albicans ATCC*" was evaluated by Bhattacharya (2010)^[17]. In the production of antifungal activities, ethanol extract is more important. The extract has a higher degree of antifungal properties in the nonpolar fractions. *C. indica* extract demonstrates excellent ant plasmodial activity against *Plasmodium falciparum*^[18]. *Plasmodium berghei* parasite count in mice is significantly reduced by the extract^[19].

Activity against Inflammation

The anti-inflammatory activity was observed in the 25-300 mg / kg dose range of *C. indica*'s aqueous leaf extract. The impact was 50 mg / kg diclofenac equivalent (20 mg / kg) but was greatly pronounced at higher doses. The effectiveness of the extract in the early stage of inflammation implies suppression of the release of histamine and serotonin^[20]. The Aqueous extracts of *C. indica* leaves and stem were inhibited formaldehyde-induced paw edema in rats^[21]. Recent research showed that the physical evaluation of ointment suggested that the *C. indica* formulation is more suitable than other formulations and that its efficacy should be further explored in harnessing the plant's ability to treat skin inflammatory diseases^[22].

Antioxidant Activity

Using the DPPH (1, 1-Diphenyl, 2-picryl-hydrazyl) free radical scavenging process, the antioxidant activity test of crude extracts was evaluated when ascorbic acid was used as normal with IC₅₀ 43.22 µg / ml. With an IC₅₀ value of 50.98 µg / m, the ethyl acetate fraction of *C. indica* displayed the highest antioxidant activity^[23]. In comparison

with methanolic extract, the aqueous extract of *C. indica* fruits and leaves demonstrated important antioxidant activity by inhibiting DPPH and radical superoxide^[24]. Study by Motiwala *et al.* (2015)^[25], showed that *C. indica* crude mucilage (dietary fiber) indicates powerful antioxidant activity by scavenging DPPH and an excellent source of its growth as an excipient of nutraceutical / pharmaceutical and functional food in the prevention of various diseases.

Anticancer Activity

Cancer is a life-threatening disease that has a global impact. Cucurbitacin B is responsible for some of *C. indica*'s anticancer properties. Cucurbitacin B suppresses telomerase activity by suppressing hTERT gene expression, halting cell cycle progression in cancer cells at the G2/M phase. Apoptosis in cancer cells has also been described as a result of the chemical^[26]. Hepatocellular carcinoma is the world's fifth most frequent malignancy and the third leading cause of cancer-related death. Sampath Kumar *et al.*, (2008)^[27], study have shown that protective effect of *C. indica* against benizidine induced hepatocellular carcinoma may be due to the presence of flavonoids and other Phyto constituents in the ethanolic extract of *C. indica*. Plant flavonoids were shown to have anticarcinogenic activity in certain experimental animals^[28]. Cucurbitacin-B, a tri-terpenoid present in the leaves of *C. indica* has also been shown to have anti-tumor activity. It inhibits the activation of JAK/STAT 3 pathways which can contribute to oncogenesis^[29].

Analgesic and Antipyretic Activity

Niazi *et al.* (2009)^[20], discovered that an aqueous extract of fresh *C. indica* leaves had analgesic efficacy comparable to morphine at 300 mg/kg, implying that the central mechanism is involved. In rats, extracts with a maximum impact of 300 mg/kg, comparable to paracetamol, were created, and hyperpyrexia was significantly reduced.

Antitussive Activity

C. indica has long been utilized by the indigenous people of India to treat asthma and cough. In comparison to the prototype antitussive drug codeine phosphate, Pattanayak (2009)^[30], found that the number of coughs acquired in the presence of both methanol extract concentrations was significantly reduced. At 100, 200, and 400 mg/kg per oral, methanol extract showed significant antitussive effect, reducing cough by 20.57, 33.73, and 56.71 percent within 90 minutes of the experiment.

Antinociceptive Activity

Tests of antinociceptive activity in acetic acid-induced gastric pain writhing in a mouse model were performed. The number of writhing's was decreased by 36.4 percent when the lowest dose of extract was measured (100 mg per kg body weight). The extract reduced the amount of writhing by 47.5 percent when a dosage of 400 mg per kg body weight was administered. When observed with a normal antinociceptive medicine, aspirin, the recorded result was significantly greater^[31]. Major and dose-dependent antinociceptive activity was also shown by methanolic leaf extract.

Hepatoprotective Activity

The liver is the largest and one of the body's most complicated internal organs. The liver is the largest and one of the body's most complicated internal organs. It plays a key role in the detoxification of many endogenous and exogenous compounds and their excretion. Therefore, liver damage has been identified as a toxicological issue caused by toxic substances and some medications. In the worldwide health care scheme, herbal drugs play an important role and there is a revival of interest in herbal medicines for the treatment of various diseases, including hepatopathy^[32]. The diethyl ether extract of *C. indica* leaves was tested in rats for hepatoprotective activity against

liver toxicity caused by carbon tetrachloride. The findings showed that the hepatoprotective efficacy of *C. indica* leaf extract at a dosage of 400 mg / kg body weight was comparable to that of 125 mg / kg body weight of silymarin under standard care [33]. We also observed the hepatoprotective role of *C. indica* leaf extract against toxic effects caused by enalapril in our previous research report. The results showed that *C. indica* leaf extract was hepatoprotective at a dose of 400 mg / kg body weight [34].

Anti-obesity Activity

Bunkrongcheapet *et al.* discovered that *C. indica* root has ant obesity properties. It worked directly on preadipocytes, preventing differentiation by inhibiting at least one primary adipogenicity transcription factor -PPAR γ . In addition to having a blood sugar

lowering effect, the presence of a potential antiadipogenic agent in this plant can make it suitable for treating metabolic diseases caused by obesity [35].

Neuroprotective agents

Vitamin B2 is a soluble vitamin in water. Since it cannot be stored in the body, it needs a regular dose. It is an important nutrient in our diet and plays a vital role in energy production. *C. indica* helps to strengthen the nervous system by providing calories, vitamins, and antioxidants. *C. indica* can help with a variety of nervous system issues, including Alzheimer's disease, epilepsy, numbness, multiple sclerosis, anxiety, and more. *C. indica*, when combined with vitamin B6, is thought to be beneficial in treating the debilitating symptoms of Carpal Tunnel Syndrome.

Table 3: Summary of the most important reported pharmacological activities of *C. indica* species

Sr. No	Plant Part(s) Used	Pharmacological Properties	References
1	Arial part and Leaves	Anti-Diabetic Activity	Kuriyan <i>et al.</i> , 2008; Jamwal & Kumar.,2019; Venkateswaran & Pari., 2002; Munasinghe <i>et al.</i> , 2011 5, 12-14
2	Leaves	Antimicrobial and Malarial Activity	Hussain <i>et al.</i> , 2010; Sivaraj <i>et al.</i> , 2011; Bhattacharya., 2010; Ravikumar <i>et al.</i> , 2012; Amalesh <i>et al.</i> , 2011 15-19
3	Leaves and Stem	Anti-Inflammatory Activity	Niazi <i>et al.</i> ,2009; Deshpande <i>et al.</i> , 2011; Nachimuthu., 2018 20-22
4	Fruits, Leaves and Mucilage	Antioxidant Activity	Bulbul <i>et al.</i> , 2011; Sharma <i>et al.</i> , 2011; Motiwala <i>et al.</i> 2015 23-25
5	Leaves	Anticancer Activity	Kumari <i>et al.</i> , 2016; Sampathkumar <i>et al.</i> , 2008; Glusker& Rossi 1986; Sun <i>et al.</i> , 2005 26-29
6	Leaves	Analgesic and Antipyretic Activity	Niazi <i>et al.</i> 2009 20
7	Leaves	Antitussive Activity	Pattanayak & Sunita., 2009 30
8	Leaves	Antinociceptive Activity	Sutradhar <i>et al.</i> , 2011 31
9	Leaves	Hepatoprotective Activity	Rao <i>et al.</i> , 2003; Kumar <i>et al.</i> , 2010; Vinothkumar <i>et al.</i> , 2019 32-34
10	Root	Antiobesity Activity	Rubatzky & Yamaguchi 35

Conclusion and Future Prospects of *Coccinia indica*

This plant has definitely been a significant source of traditional remedies for decades, some of the ethnomedicinal uses of this plant have been scientifically validated and pharmacological activities such as anti-diabetic, antimicrobial, anti-inflammatory,

antioxidant, antimalarial, antidyplidemic, anticancer, analgesic, antipyretic, antitussive, antinociceptive, hepatoprotective, ant obesity, and neuroprotective function have also been studied as discussed in this review. Every section of the plant contains several chemical components that are responsible for a wide range of pharmacological and therapeutic effects. *C. indica's* nutritional characteristics were also discussed. The goal of this review is to reignite interest in this

important medicinal plant, with the ultimate goal of repositioning and expanding its uses beyond vegetable and diabetic management to evidence-based phototherapeutic uses through scientific studies aimed at validating its folkloric medicinal and therapeutic effectiveness for drug discovery and development. As a result, more scientific validation studies in the form of toxicological and pharmacological profile of *C. indica* in more in vitro and animal models are required as a prelude to human investigations via clinical trials.

Highlights

- The goal of the review is to explore the pharmacology activities, therapeutic uses, nutritional potentials of *Coccinia indica*.
- This belongs to the *Cucurbitaceae* family and is widely used in traditional medicinal systems, including Ayurvedic, Siddha and Unani.
- Traditionally, different parts of this plant, including the roots, leaves and fruits used in folk medicine.

Conflict of Interest

None declared.

Financial Support

None declared.

REFERENCES

- Nagare S, Deokar GS, Nagare R, Phad N. Review on *Coccinia grandis* (L.) voigt (Ivy Gourd). *World J Pharm Res.* 2015;5:4910:728-43.
- Pekamwar SS, Kalyankar TM, Kokate SS. Pharmacological activities of *Coccinia grandis*. *J Appl Pharm Sci.* 2013;3:114-9.
- Kumar M, Alok S, Chanchal DK, Bijauliya RK, Yadav RD, Sabharwal M, *et al.* An updated pharmacological activity of *coccinia indica* (wight & arn.). *International journal of pharmaceutical sciences and research.* 2018;1:9(2):456-65.
- Yamaguchi M. *World vegetables: Principles, production and nutritive values.* Springer Science & Business Media. 2012.
- Kuriyan R, Rajendran R, Bantwal G, Kurpad AV. Effect of supplementation of *Coccinia cordifolia* extract on newly detected diabetic patients. *Diabetes care.* 2008;31(2):216-20.
- Vaishnav MM, Gupta KR. A new saponin from *Coccinia indica* roots. *Fitoterapia (Milano).* 1995;66(6):546-7.
- Vaishnav MM, Gupta KR. Ombuin 3-O-arabinofuranoside from *Coccinia indica*. *Fitoterapia (Milano).* 1996;67(1):67-80.
- Vaishnav MM, Jain P, Jogi SR, Gupta KR. Coccinoside-K, triterpenoid saponin from *Coccinia indica*. *Oriental Journal of Chemistry.* 2001;17(3):465-8.
- Rastogi RPMB. *Compendium of Indian Medicinal Plants.* New Delhi: CDRI, Lucknow, Publication and Information Directorate. 1993;e 818104213.
- Kundu S, Ray AB. Chemical examination of *coccinia-indica* fruits. *Journal of the Indian Chemical Society.* 1987;1;64(12):776-7.
- Dhargalkar IM, Guha SK. Nutritional values of Indian vegetables. *J. Proc. Inst. Chemists.* 1959;31:109-12.
- Jamwal A, Kumar S. Antidiabetic activity of isolated compound from *Coccinia indica*. *Indian Journal of Pharmaceutical Education and Research.* 2019;1;53(1):151-9.
- Venkateswaran S, Pari L. Effect of *Coccinia indica* on blood glucose, insulin and key hepatic enzymes in experimental diabetes. *Pharmaceutical Biology.* 2002;1;40(3):165-70.
- Munasinghe MA, Abeysena C, Yaddhegige IS, Vidanapathirana T, Piyumal KP. Blood sugar lowering effect of *Coccinia grandis* (L.) J. Voigt: path for a new drug for diabetes mellitus. *Experimental diabetes research.* 2011;e21822423.
- Hussain A, Wahab S, Zarin I, Hussain MS. Antibacterial activity of the leaves of *Coccinia indica* (W. and A) Wof India. *Advances in biological research.* 2010;4(5):241-8.
- Sivaraj A, Jenifa BP, Kavitha M, Inbasekar P, Senthilkumar B, Panneerselvam A. Antibacterial activity of *Coccinia grandis* leaf extract on selective bacterial strains. *Journal of Applied Pharmaceutical Science.* 2011;1;1(7):12.

- Bhattacharya B, Samanta M, Pal P, Chakraborty S, Samanta A. In vitro evaluation of antifungal and antibacterial activities of the plant *Coccinia grandis* (L.) voigt (Family-Cucurbitaceae). *Journal of Phytology.* 2010;2(11):52-7.
- Ravikumar S, Inbaneson SJ, Suganthi P. In vitro antiplasmodial activity of ethanolic extracts of South Indian medicinal plants against *Plasmodium falciparum*. *Asian Pacific Journal of Tropical Disease.* 2012; 1;2(3):180-3.
- Amalesh S, Bolay B, Soma G, Das G. In vivo antimalarial activity of the plant *Coccinia grandis*. *International Journal of Pharma-ceutical Research and Development.* 2011;3(4):73-9.
- Niazi J, Singh P, Bansal Y, Goel RK. Anti-inflammatory, analgesic and antipyretic activity of aqueous extract of fresh leaves of *Coccinia indica*. *Inflammopharmacology.* 2009;17(4):239-44.
- Deshpande SV, Patil MJ, Daswadkar SC, Suralkar U, Agarwal A. A study on anti-inflammatory activity of the leaf and stem extracts of *Coccinia grandis* Voigt. *Int J Appl Bio Pharm.* 2011;2:247-50.
- Nachimuthu S. Development and evaluation of anti inflammatory ointment using aqueous extract of *Coccinia grandis* L. *International Journal of Green Pharmacy (IJGP).* 2018;7;12(03):589-96.
- Bulbul II, Nahar L, Ripa FA, Haque O. Antibacterial, cytotoxic and antioxidant activity of chloroform, n-hexane and ethyl acetate extract of plant *Amaranthus spinosus*. *International Journal of PharmTech Research.* 2011;3(3):1675-80.
- Sharma AK, Chaudhary M, Kumar R, Chauhan B, Sharma S, Sharma AD, *et al.* Antioxidant Activity of *Coccinia grandis* Fruits and Leaves. *Inventi Rapid: Ethnopharmacology.* 2011.
- Motiwalla MN, Dumore MN, Rokde VV, Bodhe MM, Gupta RA, Dumore NG, Danao KR. Characterization and antioxidant potential of *Coccinia indica* fruit mucilage: Evaluation of its binding properties. *Bioactive carbohydrates and dietary fibre.* 2015;6(2):69-74.
- Kumari R, Agrawal A, Tiwari M, Shukla SH, Dubey GP. Role of *Coccinia indica* in the prevention and management of breast cancer: A review. *J Ayu Herb Med.* 2016;2(2):56-60.
- Sampathkumar P, Prabhakaran K, Dheeba B, Vinothkannan R, Vinothprasanna G, Sheikabdulla S, *et al.* Antitumor promoting potential of *coccinia indica* against benizidine induced hepatocellular carcinoma in mice. *Journal of Cell and Tissue Research.* 2008;1;8(3):1599.
- Glusker JP, Rossi M. Molecular aspects of chemical carcinogens and bioflavonoids. In *Plant Flavonoids in Biology and Medicine*, Buffalo, New York (USA). 1986;22-26.
- Sun J, Blaskovich MA, Jove R, Livingston SK, Coppola D, Sebt SM, *et al.* Cucurbitacin Q: a selective STAT3 activation inhibitor with potent antitumor activity. *Oncogene.* 2005;24(20):3236-45.
- Pattanayak SP, Sunita P. In vivo antitussive activity of *Coccinia grandis* against irritant aerosol and sulfur dioxide-induced cough model in rodents. *Bangladesh Journal of Pharmacology.* 2009;20;4(2):84-7.
- Sutradhar BK, Islam MJ, Shoyeb MA, Khaleque HN, Sintaha M, Noor FA, *et al.* An evaluation of antihyperglycemic and antinociceptive effects of crude methanol extract of *Coccinia grandis* (L.) J. Voigt. (Cucurbitaceae) leaves in Swiss albino mice. *Advances in Natural and Applied Sciences.* 2011;5(1):1-5.
- Rao GM, Vijayakumar M, Rao C, Rawat AK, Mehrotra S. Hepatoprotective Effect of *Coccinia indica* Against CCl₄ Induced Hepatotoxicity. *Natural Product Sciences.* 2003;9(1):13-7.
- Kumar BS, Gnanasekaran D, Jaishree V, Channabasavaraj KP. Hepatoprotective activity of *Coccinia indica* leaves extract. *Int J Pharm Biomed Res.* 2010;14:154-6.
- Vinothkumar G, Venkataraman P, Vinodhini VM, Lavanya R, Sathishkumar D. Effect of *Coccinia indica* leaf extract on angiotensin converting enzyme (ACE) inhibitor induced hepatotoxicity in wistar albino rats. *Clinical Nutrition Experimental.* 2019;1;24:24-33.
- Bunkrongcheap R, Hutadilok-Towatana N, Noipha K, Wattanapiromsakul C, Inafuku M, Oku H, *et al.* Ivy gourd (*Coccinia grandis* L. Voigt) root suppresses adipocyte differentiation in 3T3-L1 cells. *Lipids in health and disease.* 2014;13(1):1-0.

HOW TO CITE THIS ARTICLE

Padma R, Kumar GV. *Coccinia indica*: A Comprehensive Review of Pharmacology, Therapeutic Applications, Nutritional Potentials, and Future Prospects. *J Phytopharmacol* 2022; 11(3):211-216. doi: 10.31254/phyto.2022.11313

Creative Commons (CC) License-

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. (<http://creativecommons.org/licenses/by/4.0/>).