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**Shinde Priyanka**
Assistant Professor, Department of Pharmacognocy JBVP Vidya Niketan College of Pharmacy, Lakhewadi, Indapur, Pune, Maharashtra, India

**Korade Sakshi**
Students of Vidya Niketan College of Pharmacy, Lakhewadi, Indapur, Pune, Maharashtra, India

**Korake Pooja**
Students of Vidya Niketan College of Pharmacy, Lakhewadi, Indapur, Pune, Maharashtra, India

**Corresponding Author:**
**Korade Sakshi**
Students of Vidya Niketan College of Pharmacy, Lakhewadi, Indapur, Pune, Maharashtra, India

# Pharmacological study: A review on *Caesalpinia bonducella*

**Shinde Priyanka, Korade Sakshi and Korake Pooja**

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**Abstract**
*Caesalpinia bonducella* (syn. *Caesalpinia bonduc, Caesalpinia crista)*, a pivotal medicinal plant belonging to the family *Caesalpiniaceae*, is a large, prickly, perennial shrub widely distributed throughout tropical and subtropical regions, particularly in India, Sri Lanka, and the Andaman and Nicobar Islands. Historically, this plant has been a cornerstone of indigenous medical systems such as Ayurveda, Siddha, Unani, and Homoeopathy, where it is extensively used to treat a wide range of ailments, including fevers (especially intermittent and malarial fevers), diabetes, tumors, skin diseases, inflammation, and abdominal pain. All parts of the plant, from roots to seeds, are considered therapeutically valuable. Morphologically, the plant is characterized by its extensive climbing habit, dark grey branches armed with both hooked and straight yellow prickles, and large bipinnate leaves 30-60 cm long. It bears yellow flowers and hard, non-crystalline seeds known commonly as "fever nuts" or Sagargota. Phytochemical analyses have revealed a rich array of secondary metabolites, including alkaloids, flavonoids, glycosides, saponins, tannins, and triterpenoids. Key chemical compounds isolated from the seeds, stems, and roots are cassane and norcassane diterpenoids, such as *caesalpinins, caesalmins*, and *norcaesalpinins*. The leaves contain phenolic acids like gallic and caffeic acid. Recent pharmacological studies conducted *in vitro* and *in vivo* have scientifically validated many of its traditional uses, reporting significant anticancer, hepatoprotective, antioxidant, antimalarial, antimicrobial, anti-inflammatory, and antidiabetic activities. The seed kernels are particularly noted for their anxiolytic, anticonvulsant, and antifilarial properties. In conclusion, *Caesalpinia bonducella* is a valuable, though arguably under-documented, source of potent bioactive compounds. Further rigorous preclinical and clinical investigations into its specific bioactive molecules are warranted to fully harness its immense potential and develop novel therapeutic formulations for modern clinical use, thus bridging the gap between traditional wisdom and modern medicine.

**Keywords:** *Caesalpinia bonducella*, traditional medicine, phytochemistry, pharmacological activity.

## Introduction
The *Caesalpinia*ceae family includes the "fever nut," which is also called *Caesalpinia bonducella L.* The plant factory is depicted in Figure 1-3.
The family *Caesalpiniacaeae* is represented by the genus *Caesalpinia*, which is found in the Plantar region's Bordetella factory and utilized as a herbal cure. Part used: *C. Bordetella* seeds (Figure 1), also known as Karanja or Karachi, belong to the species C. Bordetella. According to this literature, the maturity of the factory's corridor has remedial rates. Terpenoids and saponins, as well as the amazing glycoside, the active chemical, conducting, seeds, are also known to be present. [4]. *Caesalpinia bonducella L.* (Family: Fabaceae) is a significant medicinal plant that is widely distributed throughout Asia and the Caribbean's tropical and tropical regions. [5] This kind of factory is widespread in the woodlands and agricultural regions of Bangladesh, including North Bengal, Dhaka, Chittagong, Khulna, and Tangier. Fruits are overrepresented capsules covered in whirly pinpoints, seeds are oblong or spherical, hard, slate in color, with a smooth, glossy surface, and there are one or two tiny, recurved pinpoints between each of the seven couples of pinnate and three to eight couples of circulars on the underside. The flowers are unheroic and grow in dense, lengthy, peduncle supra-axillary racemes at the summit. The plant is a big, sprawling, and exceptionally thorny shrub, with branches covered with hooks and straight, hard unheroic pinpoints. The leaves are big, bipinnate, stippled, and fallacious. The factory is known as fever nut or nicker nut in English and as data in Bengali. Traditional medicines employ a colorful factory hallway extensively to treat a variety of ailments [6, 7].

Seeds contain satiric, politic, octave-4, octave-2, oligomeric, linoleic, and Olaf acids. Additionally, there is aspartic acid, coralline, *Caesalpinia bonducella*, and arginine. The entire Bordetella facility for *Caesalpinia bonducella* is used for medicinal purposes. The leaves and their juice or paste are used to treat liver conditions, elephantiasis, smallpox, and to get rid of offensive sweat odors. It is also used to alleviate toothaches. *Bonducella* possesses tonic, anthelmitic, antiperiodic, and febrifuge properties. Quinine is replaced with the powder, which is created from roasted capsules.

The placenta has been removed after labor using the root dinghy, which has also been used to treat intestinal worms, problems, excrescences, coughs, and amenorrhea. The flower has a strong taste and a warming effect on the body. It improves the relationship between data and Kafka [8]. *Bonducella* fruits are used to treat injuries, piles [10], and hemorrhoids [9].

Boiled leaves can be used for gargling to relief from sore throat. The seeds' strong rates make them useful in treating leprosy, hydrogel, stomachache, infectious disorders, inflammation, and skin problems [11]. Seed sprouts may help alleviate excrescence.

The leaves and seeds can be used to cure hydrogel, hemorrhoids, inflammatory lumps, orchids, and other conditions after being roasted in castor oil painting oil. The seeds of the plant, according to reports, have antidiarrheal, antiviral, antibacterial, antimicrobial, antifungal, Bonducella antitumor, antipyretic and analgesic, antimalarial, anti-inflammatory, antioxidant, immunomodulatory, adaptogenic, anticonvulsant, antispasmodic, nootropic, antifeedant, antiamoebic, antiestrogenic, diuretic, insecticidal, and trypsin and chymotrypsin inhibitors [12- 16].

## Plant Description

**Fig 1:** *Caesalpinia bonducella* Fruit

### Leaves

*Bonducella* is a shrub with big, branching, lush leaves that range in length from 30 to 60 cm. The splint has prickly petioles on the rearward side. There are six to eight sets of pinnae with a couple of stipulary backbones at the base of the splint, which also has reduced pinnae with an elongated mucronate point [17].

### Flowers

The factory has extremely thick blooms with axillary racemes that are thick at the top and thin at the base. The factory's flowers generally measure 15 to 25 centimeters in length. The factory produces kids with short pedicles that measure around 5 millimeters in bloom and 8 millimeters in fruit [18].

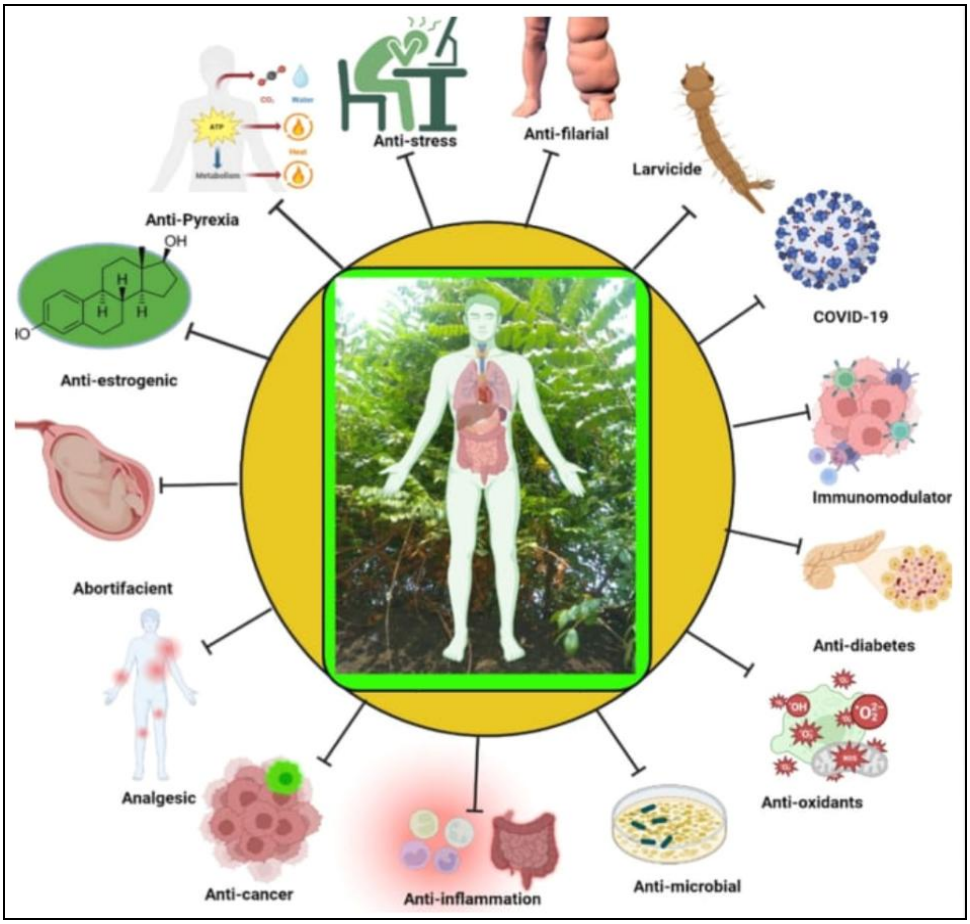
### Seeds

Due to the close squeezing of bordering seeds, the hard-coated, greenish or slate seeds have a small contraction on one side. The globular, black seeds have perpendicular crevices on them. The testa, which has three layers and is between 1 and 1.25 millimeters thick, is discovered to be separated from the kernels of dry seeds [19].

It displays the micropyle and helium close to each other. Hilum generally has a pusillanimous residual to the funicle and is girdled by a dim area. Micropyle is located near to a dim quarter's boundaries. It has a seed coat that is rather pale blue in color and ranges from dim green to argentine [20].

### Traditional and modern uses

In many indigenous cultures throughout the world, *C. bonducella* has been associated to a variety of diseases. The seeds have been used as a styptic to treat a variety of ailments, including malaria, hydrocele, inflammation, helminthiasis, colic pain, and skin issues. The symptoms of orchitis and hydrocele in Madras (Chennai) can be effectively treated by topically applying an ointment made from ground pant seeds in castor oil. Additionally, the oil taken from the plant's seeds has been demonstrated to have the ability to control convulsions and paralysis. In Guinea, the crushed seeds of the shrub are utilized as a vesicant. The powdered seeds were found to have weak antiperiodic effects when given to malaria patients along with an equivalent amount of pepper powder. However, it was unable to alleviate the symptoms of severe malaria. [21]. An internal application of a paste composed of powdered seeds in water has been shown to be very beneficial in cases of snake bite, even if it cannot be considered as an antidote against snake venom. When crushed, powdered, and consumed with honey and long pepper, the plant's seeds have expectorant qualities. Roasted seeds have been used by natives in the West Indies to alleviate diabetes symptoms. The powdered seed kernel is combined with equal amounts black pepper and taken three times a day in doses of 15-30 grains for adults and 3-4 grains for children. This has been shown to be extremely helpful for youngsters suffering from basic, persistent, and sporadic fevers. Toothaches, liver issues, inflammation, and malignancies have all historically been treated with the plant's leaves and twigs. The climber's leaves and juices have long been used to treat illnesses such as smallpox and elephantiasis [22].




## Plant profile

**Fig 2:** *Caesalpinia bonducella* plant

- **Synonyms:** *Caesalpinia bonduc*, *Guilandina bonducella*, *Guilandina bonduc* and *Caesalpinia crista.*
- **Biological Source:** The biological source of *Caesalpinia bonducella* is the entire large, prickly shrub. All parts of the plant, including the root, stem, leaves, and seeds, are recognized for their medicinal value.
- **Family:** *Fabaceae* (or *Caesalpiniaceae*).
- **Geographical Source:** It is native to large parts of Africa, Asia, and the Americas.

**Morphological characteristics**
- Colour-Light brown.
- Odour-Characteristic odour.
- Taste-Astringent.

**Taxonomic classification**
- **Kingdom:** Plantae
- **Phylum:** *Magnoliophyta*
- **Division:** *Magnoliopsida*
- **Class:** *Angiospermae*
- **Order:** Fabales
- **Family:** *Fabaceae / Caesalpiniaceae*
- **Genus:** *Caesalpinia*
- **Species:** *Bonducella*

**Physicochemical standards**
Regarding the *C. bonducella* standardization parameters, see Table 1 for the following: extractive value in ethanol, extractive value in water, extractive value in ethyl acetate, solubility in alcohol, extractive value in chloroform, total ash value, acid insoluble, water insoluble, sulphated ash, extractive value in hexane, and foreign matter [23-25].

**Table 1:** Physicochemical properties of *C. bonducella*

| Sr. No | Parameters | Physicochemical properties |
|---|---|---|
| 1. | Taste | Astringent |
| 2. | Colour | Light brown |
| 3. | Odour | Characteristic odour |
| 4. | Foreign Matter (%) | 0.979 |
| 5. | Loss of drying (%) | 8.83 |
| 6. | Total ash (%) | 3.37 |
| 7. | Acid insoluble ash (%) | 0.49 |
| 8. | Water soluble (%) | 1.69 |
| 9. | Sulphate ash (%) | 4.37 |
| 10. | Solubility in alcohol (%) | 26.8 |
| 11. | Extractive value in chloroform (%) | 2.58 |
| 12. | Extractive value in ethyl acetate (%) | 0.92 |
| 13. | Extractive value in ethanol (%) | 2.92 |
| 14. | Extractive value in water (%) | 6.7 |

**Phytochemical constituents**
The seeds, which have been set up to include terpenoids, caesalpin, β- caesalpin, α- caesalpin, and neutral saponin, are among the numerous salutary phytochemicals that have been taken from the various plant corridor. Phytosterols similar sitosterol, heptocosane noncrystalline, bitter glycoside, bonducin, and neutral saponin are set up in kernels; pinitol, glucose, calcium, and brazillin are set up in leaves; homoisoflavonoids, 6-Omethylcaesalpinianone, and caesalpinianone are set up in bark; and cassane furanoditerpene, caesalpinin, bonducellpins A, B, C, D, and diosgenin are produced by roots (see table 2). Caesalpinin, bonducellpins A, B, C, D, and diosgenin are produced by roots (see table 2). Leaves • Flavonoids (similar as Quercrtin and Brazilin) • Phenolic acids similar as gallic acid and caffeic acid. • Alkaloids • Pinitol Seeds-Alkaloids (similar as Bonducin, Bonducillin)-Saponins like Diosgenin-Lipid acids (similar as palmitic, oleic, and linoleic acids)-Carbohydrates (e.g., brio, sucrose) Roots-Homoisoflavonoids (similar as *Caesalpinia*none)-diterpenoids (e.g., BonducellpinsA-D)-Phenolics and Tannins Fruits-Neocaesalpines-pinitol D(+), (Table 2). The chemical makeup of C. bonducella Numbering of Parts Chemical Makeup 1. Phytosterols- sitosterol, heptocosane noncrystalline, bitter glycoside, bonducin, neutral saponin, and seed kernel. Seed-Neutral saponin, terpenoids, caesalpin, B- caesalpin, and birth caesalpin.
Multitudinous salutary phytochemicals have been uprooted from colorful factory corridor, including the seeds, which have been shown to contain terpenoids, caesalpin, β-caesalpin, α- caesalpin, and neutral saponin. Phytosterols similar as sitosterol, heptocosane noncrystalline, bitter glycoside, bonducin, and neutral saponin are set up in kernels; pinitol, glucose, calcium, and brazillin are set up in leaves; homoisoflavonoids, 6- Omethylcaesalpinianone, and caesalpinianone are set up in dinghy; and cassane furanoditerpene, caesalpinin, bonducellpins A, B, C, D, and diosgenin are developed by roots (see table 2).

**Leaves**
- Flavonoids (e.g, Brazilin, Quercrtin).
- Phenolic acids (e.g, Gallic acid, Caffeic acid).
- Alkaloids.
- Pinitol.

**Seeds**
- Alkaloids (e.g, Bonducin, Bonducillin).
- Saponins (e.g, Diosgenin).
- Adipose acids (e.g, Oleic acid, Palmic acid and Linolic acid)
- Carbohydrates (e.g, Sucrose, bounce).

**Roots**
- Homoisoflavonoids (e.g, *Caesalpinia*none).
- Diterpenoids (e.g, BonducellpinsA-D).
- Tannins and Phenolics.

**Fruits**
- Neocaesalpines
- D(+) pinitol

**Table 2:** Chemical components of *C. bonducella*

| Sr. No | Parts | Chemical Constituents |
|---|---|---|
| 1. | Seed kernel | Phytosterols-sitosterol, heptocosane noncrystalline, bitter glycoside, bonducin, neutral saponin |
| 2. | Seed | *Neutral saponin, terpenoids, caesalpin, B-caesalpin* and *alpha caesalpin* |

**Rescent pharmacological studies**

Numerous pharmacological investigations were inspired by the discovery of a variety of phytochemicals in different plant parts. However, there is still a lack of research and documentation on the plant. More thorough scientific research may uncover a wealth of undiscovered phytochemicals that hold great promise for opening new directions and methods in the field of clinical treatments. [29] Table 3 shows how various plant sections have been described in various scientific books as having important qualities.

**Table 3:** Recent pharmacological studies of seeds, leaves and flowers

| Sr. No | Plants part | Uses | References |
|---|---|---|---|
| 1. | Seeds | Antiinflammatory | 30 |
| 2. | Seeds | Antimicrobial | 31 |
| 3. | All parts | Immunomodulator | 32 |
| 4. | Seeds | Hypoglycemic and Antidiabetic | 33 |
| 5. | Flower | Analgesic | 34 |
| 6. | Leaves | Antioxidative stressive stress | 35 |
| 7. | Seeds | Antidepresants | 36 |
| 8. | Seeds | Antipyretic | 37 |
| 9. | Seeds | Antiaesthematic | 38 |
| 10. | Leaves | Hepatoprotective | 39 |
| 11. | Young twigs and leaves | Anticancer | 40 |
| 12. | Leaves | Antifeedant | 41 |
| 13. | Seeds | Antibacterial and cytotoxic effects | 42 |
| 14. | Leaves | Nephroprotective | 43 |
| 15. | Seeds | Hypolipidemic | 44 |
| 16. | Seeds | Antiallergic and Antihistaminic action | 45 |
| 17. | Seeds | Antifertility | 46 |
| 18. | Leaves | Antiproliferative and Pro-apoptotic | 47 |
| 19. | Leaves | Anthalmentic | 48 |
| 20. | Seeds | Antiulcer | 49 |
| 21. | Seeds | Antimycobacterial activity | 50 |
| 22. | Seeds | Anticataract | 51 |
| 23. | Leaves | Antidiarrhoeal | 52 |
| 24. | Seeds | Antifilaria | 53 |
| 25. | Leaves | Muscle contractile activity | 54 |
| 26. | Leaves | Antifungal and antispamodic | 55 |
| 27. | Seeds | Antiestrogenic activity | 56 |
| 28. | Seeds | Antidiauretic | 57 |
| 29. | Leaves | Antitumor | 58 |
| 30. | Seeds | Anxiolytic | 59 |
| 31. | Seeds | Anticonvulsant | 60 |

**Pharmacological Activities**

- **Antioxidant Activity:** The ethanolic concentrates of *C. bonducella* seeds possessed good level of phenolic components and were prepared for repressing, quenching free radicals to end the radical chain reaction, and acting as reducing agents [61] DPPH verified the ethanol leaf extract of *Caesalpinia bonduc's* possible antioxidant activity. The results suggest that the antioxidant activity may add to the cytotoxic character of the plant which may be the next study to be carried out. [62]. Chloroform extract of *Caesalpinia bonducella* seeds demonstrates antioxidant activity [63].
- **Anticancer Activity:** When *Caesalpinia bonducella* is compared to well-known anti-cancer medications, the binding energy and interactions with the proteins are extremely similar [64].
- **Antiviral Activity:** An ethanolic extract of the root and stem displayed activity against the Vaccinia virus. [65] Anti-Amyloidogenic/Alzheimer's illness aqueous extract from *Caesalpinia* leaves may have anti-amyloidogenic properties. Study demonstrated aqueous extract of Latakaranj could inhibit the Abeta aggregration from monomers and oligomers and able to dissolve the preformed fibrils [66].
- **Antipyretic activity:** The *Caesalpinia bonducella* seed kernel extract showed marked antipyretic effect against Brewer's yeast-initiated pyrexia in rats. In the hot plate and tail flick procedures, the concentrate demonstrated a strong central analgesic effect. According to the study's findings, the ethanolic extract of *Caesalpinia bonducella* seed kernel possesses potent antipyretic and anticiceptive properties, supporting its use in the management of pyretic diseases and pain [67]. An effective source of antipyretic agents is *C. bonducella* seed oil [68].
- **Antifungal Activity:** High to moderate antifungal activity against *Alternaria solani, Fusarium oxysporum*, *Candida albicans*, and *Aspergillus Niger* is demonstrated by the aqueous and ethyl acetic acid extracts of *C.bonducella* seeds. It implies *C. bonducella*

possesses a potential to control major fungal infections. It might be because of the presence of a few bioactive chemicals that include oils, saponins, sterols, glycosides, tannins, alkaloids, phenols, resins and flavonoides in seeds of *C. bonducella* [69].

- **Antifilarial Activity:** The *C. bonducella* seed part (specifically, the seed kernel extract and its fractions) demonstrated microfilaricidal and female-sterilizing viability against Brugia malayi in animal models, demonstrating the capability of this plant in giving a lead to new antifilarial tranquilize development [70].
- **Antimalarial Activity:** *P. falciparum* growth was inhibited by 56%, 65%, and 76% in cold ethanol, aqueous, and hot ethanol extracts of *Caesalpinia bonducella* seeds, respectively. It encourages *C. bonducella's* antimalarial activity [71].
- **Neuroprotective Activity:** The methanolic and aqueous extract of *Caesalpinia bonducella (Roxb)* has showed considerable neuroprotective activity comparison to the reference medication (Vitamin E). *Caesalpinia bonducella (Roxb)* extracts exhibit remarkable antioxidant activity due to potential multiple effects involving significant protection against oxidative damage, which may be attributed to its protective activity on lipid peroxidation and resistance adding to the assurance against oxidative damage [72].
- **Diuretic Activity:** Both the aqueous and methanol concentrates of *C. bonducella* revealed a dose-dependent increase in urine discharge. When compared to the methanol extract, the aqueous concentration produced the greatest increase in urine output at 300 mg/kg. Study provides a quantitative basis to explain the traditional usage of *C. bonducella* as a diuretic agent in Moroccan population [73].
- **Activity against Fertility:** *Caesalpinia bonducella*, the test drug, has strong antiimplantation, anti-estrogenic, abortion, and antiovulatory effects. *Caesalpinia bonducella Linn. Roxb*. Root bark (ERb) is an anti-fertility agent that can be used to induce sterility [74].

## Conclusion

In summary, the current study's findings demonstrated that the crude ethanolic and aqueous extracts of *Caesalpinia bonducella* contain quinines, phenolic compounds, proteins, carbohydrates, alkaloids, flavonoids, tannins, and saponins. There was a good amount of lipids and waxes, terpenoids and phenolics, Q. Alkaloid, and N-Oxides. It demonstrated strong antifungal and antibacterial properties. It could serve as a substitute for commercially available synthetic antibiotics. Its antibacterial and antifungal qualities may therefore contribute to its positive effects on both human and animal health by providing defense against a range of illnesses. The criteria established by the results of this study can be used to determine the authenticity of this plant. To support and validate the medication, preliminary phytochemical and phytochemical analysis findings may be helpful. The current work could be a helpful addition to a more thorough evaluation and investigation of the plant.

## References


1. Manikandaselvi S, Vadivel V, Brindha P. *Caesalpinia bonducella* L. A nutraceuticals plant. J Chem Pharm Res. 2015;7(12):137-42.
2. Kannur DM, Paranjpe MP, Sonavane LV, Dongre PP, Khandelwal KR. Evaluation of *Caesalpinia bonducella* seed coat extract for anti-inflammatory and analgesic. J Adv Pharm Technol Res. 2012;3(3):171-5.
3. Kumar SR, Shastri S, Venkatesh R, Pradeepa K, Krishna V. Antibacterial potential of *Caesalpinia bonducella* extracts and their isolated phytoconstituents: In vitro and in silico analysis. J Appl Biol Biotechnol. 2019;7(03):41-6.
4. Tummin KMC. Chemical examination of seeds of *Caesalpinia bonducella* Fiem. J Indian Chem Soc. 1930;7:207.
5. Asolkar LV, Kakkar KK, Chakre OJ. Second Suppl. Part 1, to glossary of Indian medicinal plants with active principles. New Delhi: PID-CSIR; 1992. p. 150.
6. Nazeerullah K, Sunil K, Pal SR, Neelam D. A Pharmacognostic and pharmacological overview on *Caesalpinia bonducella*. Res J Pharm Biol Chem Sci. 2012;3:480-96.
7. Moon K, Khadabadi SS, Deokate UA, Deore SL. *Caesalpinia bonducella* F- An overview. Report and Opinion. 2010;2:83-90.
8. Sivakrishnan S, Kavitha J. Herbal Drugs, Diet and Lifestyle Changes for Liver Diseases- A Review. J Global Pharma Technol. 2019;11(03):12-21.
9. Swamivelmanickam M, Sivakrishnan S. Ethnopharmacology of Boraginaceae Family- An Update. J Global Pharma Technol. 2019;11(9):10-24.
10. Sivakrishnan S, Swamivelmanickam M. A comprehensive review of hepatotoxins. Int Res J Pharm. 2019;6(10):1-4.
11. Sivakrishnan S, Swamivelmanickam M. A comprehensive review of Albizia procera (Roxb.) Benth. -An update. Int J Pharm Sci Res. 2019;10(9):4129-44.
12. Kshirsagar SN. Nootropic activity of dried seed kernels of *Caesalpinia* crista Linn against scopolamine induced amnesia in mice. Int J Pharma Tech Res. 2011;3:104-9.
13. Emmanuel N, Swaran D. Biological effects of *Caesalpinia* crista seed extracts on *Helicoverpa armigera* (Lepidoptera: Noctuidae) and its predator, Coccinella septempunctata (Coleoptera: Coccinellidae). J Asia-Pac Entomol. 2006;9:159-64.
14. Raghunathan K, Mitra R. Pharmacognosy of indigenous drugs, part-I. New Delhi: Central Council for Research in Ayurveda Siddha; 1982. p. 484-510.
15. Khedkar A, Mandavkar YD, Shinde G, Khalure P, Pravin D. Diuretic effect of *Caesalpinia* bonduc in rats. Bangladesh J Pharmacol. 2011;6:61-3.
16. Arindam B, Shruti R, Babu CR. A trypsin and chymotrypsin inhibitor from *Caesalpinia* bonduc seeds: Isolation, partial characterization and insecticidal properties. Plant Physiol Biochem. 2007;45:169-77.
17. Dhar ML, Dhar MM, Dhawan BN, Mehrotra BN, Ray C. Screening of Indian plants for biological activity. Indian J Exp Biol. 1968;6(4):232-47.
18. Ramesh BN, Indi SS, Rao KSJ. Anti-amyloidogenic Property of Leaf Aqueous Extract of *Caesalpinia Crista*. Neurosci Lett. 2010;379(3). DOI: 10.1016/j.neulet.2010.03.062.
19. Archana P, Tandan SK, Chandra S, Lal J. Antipyretic and analgesic activities of *Caesalpinia bonducella* seed kernel extract. Phytother Res. 2005;19(5):376-81.

20. Shukla S, Mehta A, Mehta P, Vyas PS, Shukla S, Bajpai VK. Studies on anti-inflammatory, antipyretic and analgesic properties of *Caesalpinia bonducella* F. seed oil in experimental animal models. Food Chem Toxicol. 2010;48(1):61-4.
21. Sachan NK, Verma S, Sachan AK, Arshad H. An investigation to antioxidant activity of *Caesalpinia bonducella* seeds. Ann Pharm Pharm Sci. 2010;1(2):88-91.
22. Iheagwam FN, Ogunlana OO, Ogunlana OE, Isewon I, Oyelade J. Potential Anti-Cancer Flavonoids Isolated from *Caesalpinia* bonduc Young Twigs and Leaves: Molecular Docking and In Silico Studies. Bioinform Biol Insights. 2019;13:1-16.
23. Khandagale PD, Puri AV, Ansari YN, Patil RY. Pharmacognostic, physicochemical and phytochemical investigation of *Caesalpinia bonducella* [L.] Roxb Seed. Int J Pharm Biol Sci. 2018;8(3):461-8.
24. Sembiring E, Elya B, Sauriasari R. Phytochemical screening, total flavonoid and total phenolic content, and antioxidant activity of different parts of *Caesalpinia bonducella* (L.) Roxb. Pharmacogn J. 2018;10(1):123-7.
25. Subbiah V, Nagaraja P, Narayan P, Nagendra HG. Evaluation of pharmacological properties of *Caesalpinia bonducella* seed and shell extract. J Pharmacogn. 2019;11(1):150-4.
26. Jagdale RA, Somkuwar AP, Bhoye SK, Sarode KG, Limsay RP. In vivo anti-inflammatory activity and GC-MS analysis of hydroethanolic extract of *Caesalpinia bonducella* seeds. J Pharmacogn Phytochem. 2019;8(3):929-34.
27. Reichal C, Prathiba, Vishnpriya V, Ponnulakshmi R, Gayathri R, Madhan K, *et al*. Studies on antimicrobial activity of *Caesalpinia bonducella* seed ethanolic extract on selected human oral pathogens. Drug Invent Today. 2019;12(4):806-8.
28. Fouzia K, Nida D, Mehreen L, Muhammad Y, Zulfiqar A, Ahmed M. Immunomodulatory activities of extracts of *Caesalpinia* pulcherrima. J Herbs Spices Med Plants. 2018;24(3):245-56.
29. Jagdale RA, Somkuwar AP, Bhoye SK, Sarode KG, Limsay RP. In vivo anti-inflammatory activity and GC-MS analysis of hydroethanolic extract of *Caesalpinia bonducella* seeds. J Pharmacogn Phytochem. 2019;8(3):929-934.
30. Reichal C, Prathiba, Vishnpriya V, Ponnulakshmi R, Gayathri R, Madhan K, *et al*. Studies on antimicrobial activity of *Caesalpinia bonducella* seed ethanolic extract on selected human oral pathogens. Drug Invent Today. 2019;12(4):806-8.
31. Fouzia K, Nida D, Mehreen L, Muhammad Y, Zulfiqar A, Ahmed M. Immunomodulatory activities of extracts of Caesalpinia pulcherrima. J Herbs Spices Med Plants. 2018;24(3):245-56.
32. Aswar P, Kuchekar B. Assessment of hypoglycemic and antidiabetic effects of *Caesalpinia bonducella* (L.) Roxb. seeds in alloxan induced diabetic rat and its phytochemical, microscopic, biochemical and histopathological evaluation. Asian J Plant Sci Res. 2011;1(3):91-102.
33. Aruna D, Tandan S, Kumar D, Shailesh P, Dudhgaonkar, Lal J. Analgesic activity of *Caesalpinia bonducella* flower extract. Pharm Biol. 2008;46(11):668-72.
34. Bharath KP, Ponnu LR, Selvaraj J, Shyamaladevi B, Madhan K, Vishnupriya V, *et al*. Antioxidative stress potentials of *Caesalpinia bonducella* in cardiac tissue of nicotineinduced experimental rats. Drug Invent Today. 2019;12(3):402-6.
35. Sarma P, Borah M, Das S. Evaluation of the protective effect of ethanolic extract of seed kernel of *Caesalpinia bonducella* Flem (EECB) on forced swimming-induced chronic fatigue syndrome in mice. Pharmacogn Res. 2019;11:254-9.
36. Shukla S, Mehta A. In vivo anti-inflammatory, analgesic and antipyretic activities of a medicinal plant *Caesalpinia bonducella* F. Pak J Pharm Sci. 2015;28:1517-21.
37. Khandagale PD, Puri AV. Evaluation of antiasthmatic activity of *Caesalpinia bonducella* [L.] Roxb. Seed. J Drug Deliv Ther. 2019;9(2):144-9.
38. Sumalatha, Bhat S, Kumar MR, Kumar N, Padma, Pai D, *et al*. *Caesalpinia bonducella* Linn extracts exhibit hepatoprotective effect on HepG2 cells against paracetamol by Upregulating glutathione related genes. J Krishna Inst Med Sci. 2019;8(2):1-12.
39. Nonso F, Ogunlana O, Ogunlana OE, Isewon I, Oyelade J. Potential anti-cancer flavonoids isolated from *Caesalpinia bonducella* young twigs and leaves. Bioinform Biol Insights. 2019;13:1-16.
40. Backiyaraj M, Elumalai A, Dhamodaran K, Mathivanan T, Krishnappa K, Elumalai K. Bioefficacy of *Caesalpinia bonducella* extracts against tobacco cutworm, *Helicoverpa armigera* (Hub.) (Lepidoptera: Noctuidae). J Coastal Life Med. 2005;3(5):382-8.
41. Sundar JS, Christobel RJ, Selvi NK, Abirami MP, Samuel S. Efficient green synthesis of silver nanoparticles from *Caesalpinia bonducella* seeds and its antibacterial and cytotoxic effects *in vitro* study. Pharm Innov J. 2018;7(11):95-102.
42. Bharath KP, Kumar S, Kayalvizhi E, Ponnu LR, Selvaraj J, Vishnupriya V, *et al*. A study on the nephro protective effect of *Caesalpinia bonducella* on nicotine-induced rats. Drug Invent Today. 2018;10:3512-19.
43. Sarma G, Das S. The hypolipidemic activity of ethanolic extract of seed kernel of *Caesalpinia bonducella* fleming on serum lipids and atherogenesis in albino rats fed with high fat diet. Int J Basic Clin Pharmacol. 2018;7(2):266-72.
44. Vikhe S, Nirmal S. Antiallergic and antihistaminic actions of Ceasalpinia bonducella seed possible role in treatment of asthma. J Ethnopharmacol. 2018;216:251-8.
45. Tripathy B, Swain NS, Panda MK, Pradhan RN, Acharya UR. Antispermatogenic effects of seed extract of *Caesalpinia bonducella* in Swiss mice. Int J Biosci. 2018;12(4):23-34.
46. Prakash SP, Balaji KS, Lakshmi GM, Chandrashekara KT, Jayarama S. Methanol extract of *Caesalpinia bonducella* induces apoptosis via up-regulation of bax and activation of PARP in Ehrlich ascites tumor cells. Med Aromat Plants. 2016;5:273.
47. Gogoi S, Yadav AK. In vitro and *in vivo* anthelmintic effects of *Caesalpinia bonducella* (L.) Roxb. leaf extract on Hymenolepis diminuta (Cestoda) and

Syphacia obvelata (Nematoda). J Intercult Ethnopharmacol. 2016;5(4):427-33.
48. Sawian O, Girish N, Zambare, Arulmozhi S, Bansode DA. Effect of *Caesalpinia bonducella* extract in pylorus ligation induced ulcers in wistar rats. Sch Res Lib Pharm Lett. 2016;8(4):191-7.
49. Sonvane SM, Deshpande AN, Shaikh RA, Gadgul AB, Choutmahal SA, Bhosale PV. Evaluation of IN-VITRO antimycobacterial activity of *Caesalpinia bonducella* seed coat extracts. Int J Pharm Res Rev. 2016;5(10):7-11.
50. Kurmi P, Konwar M, Das S. In-vitro Anticataract activity of ethanolic extract of seed kernel of *Caesalpinia bonducella* (l.) Fleming on goat lens. Pharm Sci Monit. 2015;6(1).
51. Billah MM, Islam R, Khatun H, Parvin S, Islam E, Islam SE, *et al*. Antibacterial, antidiarrhoeal, and cytotoxic activities of methanol extract and its fractions of *Caesalpinia bonducella* (L.) Roxb leaves. BMC Complement Altern Med. 2013;13:101.
52. Gaur M, Sahoo S, Fatma N, Rastogi S, Kulshreshtha DK, Chatterjee RK, *et al*. Antifilarial activity of *Caesalpinia bonducella* against experimental filarial infections. Indian J Med Res. 2008;128:65-70.
53. Datte J, Traore A, Offoumou M, Ziegler A. Effects of leaf extract of *Caesalpinia bonducella* (Caesalpiniaceae) on the contractile activity of uterine smooth muscle of pregnant rats. J Ethnopharmacol. 1998;60(2):149-155.
54. Khan U, Ullah H, Ali K, Khan I, Ullah A, Naz R, *et al*. Antibacterial, antifungal, antispasmodic and Ca antagonist effects of *Caesalpinia bonducella*. Nat Prod Res. 2011;25(4):444-449.
55. Salunke KR, Nazeer R, Ahmed S, Marigoudar SR, Iilaram. Effect of graded doses of *Caesalpinia bonducella* seed extract on ovary and uterus in albino rats. J Basic Clin Physiol Pharmacol. 2011;22(1-2):49-53.
56. Khedkar A, Mandavkar YD, Shinde G, Khalure P, Dere P. Diuretic effect of *Caesalpinia bonducella* in rats. Bangladesh J Pharmacol. 2011;6(1):61-63.
57. Gupta M, Mazumder UK, Kumar RS, Kumar TS, Vamsi ML. Antitumor activity and antioxidant status of *Caesalpinia bonducella* against ehrlich ascites carcinoma in swiss albino mice. J Pharmacol Sci. 2004;94(2):177-184.
58. Ali A, Rao NV, Shalam M, Gouda TS, Babu J, Kumar SS. Anxiolytic activity of seed extract of *Caesalpinia Bonducella* (Roxb) in laboratory animals. Internet J Pharmacol. 2008;5(2).
59. Ali A, Rao V, Nimmagadda, Hussain, Shalam, Gouda T, *et al*. Anticonvulsive effect of seed extract of *Caesalpinia bonducella* (Roxb.). Iran J Pharmacol Ther. 2009;8(2):51-55.
60. Shukla S, Mehta P, Mehta A, Vyas SP, Bajpai VK. Preliminary phytochemical and antifungal screening of various organic extracts of *Caesalpinia bonducella* seeds. Rom Biotechnol Lett. 2011;16(4):6384-6389.
61. Shukla S, Mehta A, John J, Singh S, Mehta P, Vyas SP. Antioxidant activity and total phenolic content of ethanolic extract of *Caesalpinia bonducella* seeds. Food Chem Toxicol. 2009;47(8):1848-1851.
62. Veerabathran SK, Janaky S, Sekar T. Antioxidant Status of Leaves of Caesalpinia Bonduc. Int J Pharm Appl. 2011;2(4):262-266.
63. Sachan NK, Verma S, Sachan AK, Arshad H. An investigation to antioxidant activity of *Caesalpinia bonducella* seeds. Ann Pharm Pharm Sci. 2010;1(2):88-91.
64. Iheagwam FN, Ogunlana OO, Ogunlana OE, Isewon I, Oyelade J. Potential Anti-Cancer Flavonoids Isolated from Caesalpinia bonduc Young Twigs and Leaves: Molecular Docking and In Silico Studies. Bioinform Biol Insights. 2019;13:1-16.
65. Dhar ML, Dhar MM, Dhawan BN, Mehrotra BN, Ray C. Screening of Indian plants for biological activity. Indian J Exp Biol. 1968;6(4):232-247.
66. Ramesh BN, Indi SS, Rao KSJ. Anti-amyloidogenic Property of Leaf Aqueous Extract of Caesalpinia Crista. Neurosci Lett. 2010;475(2):110-114.
67. Archana P, Tandan SK, Chandra S, Lal J. Antipyretic and analgesic activities of *Caesalpinia bonducella* seed kernel extract. Phytother Res. 2005;19(5):376-381.
68. Shukla S, Mehta A, Mehta P, Vyas PS, Shukla S, Bajpai VK. Studies on anti-inflammatory, antipyretic and analgesic properties of *Caesalpinia bonducella* F. seed oil in experimental animal models. Food Chem Toxicol. 2010;48(1):61-64.
69. Shukla S, Mehta P, Mehta A, Vyas SP, Bajpai VK. Preliminary phytochemical and antifungal screening of various organic extracts of *Caesalpinia bonducella* seeds. Rom Biotechnol Lett. 2011;16(4):6384-6389.
70. Gaur RL, Sahoo MK, Dixit S, Fatma N, Rastogi S, Kulshreshtha DK, *et al*. Antifilarial activity of *Caesalpinia bonducella* against experimental filarial infections. Indian J Med Res. 2008;128(1):65-70.
71. Irshad S, Mannan AB. Antimalarial activity of three Pakistani medicinal plants. Pak J Pharm Sci. 2011;24(4):589-591.
72. Hosamani SD, Inamdar SS, Pandey RRK, Kulkarni PP, Vatikuti H. Neuroprotective Activity of Seeds of *Caesalpinia Bonducella* (Roxb) In Oxidative Stress Induced Rats. World J Pharm Res. 2016;5(6):1444-1457.
73. Khedkar A, Mandavkar YD, Shinde G, Khalure P, Dere P. Diuretic effect of Caesalpinia bonduc in rats. Bangladesh J Pharmacol. 2011;6(1):61-63.
74. Ravikanth K, Kanaujia A, Thakur D, Sharma A. Int J Adv Pharm Biol Chem. 2014;3(3):691-695.