



# Topic: An overview of common *Caesalpinia bonducella*, physicochemical properties,

Ms -Dhakane Gayatri Shashikant\*

Mr- Lade Harish Ravsaheb

Ms - pachorkar Gayatri balasaheb

Prof - Soniya sukdev Satpute

## ABSTRACT

*Caesalpinia bonduc* L. is a medicinal plant of the Caesalpiniaceae family. The plant may be found all throughout India. It is a huge, spiky bush. It is widely used in indigenous medical systems such as Ayurveda, Siddha, Homoeopathy, and Unani. It is regarded as a valuable remedy for the treatment of numerous ailments in Indian traditional plant medicine. The plant has antinociceptive, anxiolytic, antidiabetic, antidiarrheal, anthelmintic, adaptogenic, anti-inflammatory, antiestrogenic, antimicrobial, antimalarial, antifungal, antioxidant, antispasmodic, antipsoriatic, antiproliferative, antitumor, hepatoprotective, anticonvulsant, larvacidal, and antifilarial activities. With additional research, it is possible to infer that *C. bonduc* will be the finest source of therapy for numerous disorders in the future. As a result, efforts have been undertaken

**Keywords:** *Caesalpinia bonducella*, physicochemical properties,

## INTRODUCTION

Herbal remedies play an important part in people's well-being all over the world. Therapeutic plants are used to treat particular illnesses as well as as a possible source to maintain good health. It is necessary to know the specific ingredients in herbal drugs that are effective in certain therapies. There are countless proofs demonstrating the value of herbal plants used in various traditional frameworks. 1 It has been observed that many medicinal plants are used to treat maladies such as stomach problems, cardiovascular problems, metabolic problems, liver problems, and central nervous system abnormalities. 2 Traditional remedies rely on healing herbs in some cases. Plants require phytochemicals for survival, much as humans do. of persons from different ailments. 3 Only around 5% of the world's 300,000 plant species have been studied experimentally for their medicinal potential. Specialists have observed that poor countries rely on medicinal plants to treat illnesses, particularly in areas where clinics are lacking. 4 *Caesalpinia bonduc* is a pantropical leguminous scandent shrub that has been used as a source of medicine by the locals from ancient times and is being examined for scientific purposes by a number of researchers. *Caesalpinia bonducella* belongs to the Caesalpiniaceae family. It is also known as *C. bonducella* Flem and *C. crista* Linn. It is also known as Fever Nut, Bonduc Nut, and Nicker Nut. 5 In the conventional system of *Caesalpinia bonducella* (roxb.) is commonly used in Indian, i.e. Ayurveda, for its antiperiodic, antipyretic, soothing, anthelmintic, antimalarial, and furthermore for other illnesses including skin disorders, hydrocele, leprosy, spasms, orchitis, paralysis, and analogical nerve problems. It is also said to have antioxidant, antibacterial, anticancer, and antidiabetic properties. 6 In Chinese traditional medicine, it is beneficial to establish the moisturiser for the

treatment of agonising type cellulitis. 7 The purpose of this survey is to highlight the chemical ingredients as well as the pharmacological and therapeutic applications of *Caesalpinia bonduc*.

## Synonyms

**English:** Nicker Seed, Bonduc Nut, Fever Nut, Nicker Nut.

**Hindi:** Kantikaranja, Sagar Gota, Kantkarej.

**Urdu:** Aktimakit.

**Telugu:** Gaccakayai, Mullathige.

**Marathi:** Gajaga. Unani: Karanjwaa.

**Kannada:** Kiri gajjuga, gajjga, Gajjekayi.

**Tamil Name:** Kazarci, Kalarci paruppu, Kalarciver

**Sanskrit Name:** Prakiriya, Vitapakaranja, Kakachika, Varini, Kantakikaranja, Tirini, Valli, Kantakini, Tinagachhika, karanja, Putikaranjah, Lataakaranja, Krakachika and Karanjin.

**Geological Distribution:** The plant is found throughout Asia's tropical and subtropical zones<sup>8</sup>. It has spread to Sri Lanka, Bangladesh, Myanmar, China, and Vietnam<sup>9</sup>. It is also found in the Andaman and Nicobar Islands, as well as in India, notably in the tropical area.

**Plant parts that are useful include** root, stem, leaves, bark, seeds, and nuts.

*Caesalpinia bonduc*'s whole plant contains all key chemical ingredients such as hydrocarbons, fatty acids, steroidal saponin, aminoacids, phyosterols, isoflavones, and phenolics.

## Traditional and current applications:

The seed is said to be styptic, laxative, and anthelmintic, as well as useful in malaria, colic, hydrocele, skin disorders, and leprosy. In Madras (Chennai), an ointment made from powdered seeds and castor oil is used to treat hydrocele and orchitis. 10-13 The seeds are used as a tonic, anthelmintic, febrifuge, antibleorrhoeic, and in the treatment of hydrocele. The oil extracted from the seeds is used to treat convulsions and paralysis. Beat seeds are regarded as vesicant in Guinea. The powdered seeds were given to malaria patients together with an equal amount of pepper powder and were shown to have weak antiperiodic effects. They had no effect on malignant malaria. The seeds are crushed in water and ingested as a snake bite. The seeds do not provide an antidote to snake poison. 14-15 When seed and long pepper powders are combined with honey, they provide a powerful expectorant effect. Ingested alum-treated seeds and consumed arecanut are effective dentifrices for elastic gums, gum boils, and so on. Cooked seeds are used as an anti-diabetic agent in the West Indies. 10, 16 The kernel of the seed is quite beneficial and significant in all common cases of basic, progressed, and irregular fevers. The kernel powder is taken twice daily in an amount of 15-30 grains by adults and 3-4 grains by children in a portion of 15-30 grains. It was made official in the Indian Pharmaceutical Codex 16 with a powder component of 15-18 grains. It is claimed to provide a lot Sweating causes the fever to drop. Kernel powder combined with sugar and goat milk has excellent benefits in liver disorders. 17 In asthma, roasted kernel extract was used. Children who were unable to process mother's milk were given the kernel concentrate or powder together with ginger, salt, and nectar to provide a high stomachic effect. Boils and other swellings are relieved by a paste produced from kernels. A cake made of thirty grains of powdered kernels seared in ghee and eaten twice a day is a substantial remedy for acute orchitis, ovaritis, and scrofula. The roots are used as a febrifuge in La Reunion and Madagascar. They are mostly used as an astringent in leucorrhoea and blennorrhoea. 10,12,13,16,18 A infusion of the root is advised in Guinea for fever.

The root bark can be used to treat tumours and to remove the placenta after childbirth.<sup>14</sup> The bark of the root has a variety of properties including a febrifuge, intestinal worms, amenorrhoea, cough, and anthelmintic, among others. It is used as a rubefacient and as a topical treatment for wounds in Jamaica. Tumors, inflammation, and liver problems are commonly treated using leaves and twigs. They have also been used to alleviate dental pain. Elephantiasis and smallpox have traditionally been treated using leaves and squeezes.

## PHARMACOLOGICAL RESEARCH

Despite the fact that many pharmacological studies have been conducted based on the existence of the substances, much more may still be explored, exploited, and employed. The conclusions of these investigations are summarised below.

### **Antioxidant properties**

The ethanolic concentrate of *C. bonducella* seeds included a high concentration of phenolic components and was designed for repression, quenching free radicals to stop the radical chain reaction, and acting as a reducing agent.

19 The antioxidant activity of *Caesalpinia bonduc* ethanol leaf extract was established by DPPH. The results show that antioxidant activity may contribute to the plant's cytotoxicity, which might be investigated further in the future. 20 *Caesalpinia bonducella* seed chloroform extracts demonstrates antioxidant action. 21 The phenolic components in *C. bonduc* extract may be important contributions to its antioxidant effect. The ethanolic extract of *C. bonduc* leaves and twigs shows high catalase and peroxidase activity. As a result, it is hypothesised that it may have antioxidant qualities equivalent to recognised standards. 22

### **Activity against proliferation**

Cassane diterpenes isolated from *Caesalpinia bonduc*. The antiproliferative activity of the obtained compounds was tested against MCF-7 (breast adenocarcinoma), DU145 (prostate cancer), C33A (cervical carcinoma), and Vero (African green monkey kidney fibroblast) cells. 23

### **Anticancer**

When *Caesalpinia bonduc* was compared to existing anti-cancer medicines, the binding energy and interactions with proteins were remarkably comparable. They also have good ADMET properties, indicating that these phytochemical isolates can be used.

### **Causes Apoptosis**

Methanol extract of *Caesalpinia bonducella* at 200 mg/kg concentration was responsible for a reduction in the overall percentage of viable EAT cells (51.6%) and ascites volume (65%) in treated mice. MECB increased the rate of apoptosis, with an increasing number of cells exhibiting typical features such as membrane blebbing, apoptotic body formation, and fragmented DNA, as revealed by Giemsa and Acridine orange/Ethidium bromide (AO/EB) staining. MECB therapy also increased the survival time of mice. Furthermore, FACS data suggests that the death of MECB-treated EAT cells was caused by apoptosis rather than necrosis. In addition, the search for a molecular basis revealed that MECB reduced apoptotic Bcl-2 expression while increasing pro-apoptotic Bax expression. These findings support the antiproliferative and pro-apoptotic activities of the compound.

### **Antiviral properties**

The Vaccinia virus was inhibited by an ethanolic preparation of the root and stem.

### **Anti-Amyloidogenic/ Alzheimer's**

disease Aqueous extract of *Caesalpinia* leaf possesses anti-amyloidogenic properties. According to the findings, an aqueous extract of Latakaranj can prevent Abeta aggregation from monomers and oligomers and disintegrate preexisting fibrils. 28

### **Adaptogenic behaviour**

Cold stress and swim endurance models were used to test the adaptogenic activity of *Caesalpinia bonduc* seed extracts in rats. It was discovered that the concentrates greatly boosted swimming endurance time. Stress-induced animals indicated hypoglycemia, as well as fatigue in blood cortisol levels and an increased leukocyte count; the concentrates revealed substantial effectiveness in correcting these imbalances. 29

### **Anti-hepatotoxic properties**

After 24 hours of treatment with *Caesalpinia bonduc* separate, the injured liver was restored to normal. *Caesalpinia bonduc* has an antihepatotoxic effect at 500 mg/kg. *Caesalpinia bonduc*'s potential antihepatotoxic mechanism has yet to be identified. It is well acknowledged that the effect of *Caesalpinia bonduc* extract on liver protection is associated with glutathione-mediated detoxification as well as free radical suppression. When compared to its paracetamol-treated control group, 30 *C. bonduc* extract significantly raised the levels of glutathione in the liver, glutathione in the blood, and the movement of the liver Na<sup>+</sup>K<sup>+</sup> ATPase. *C. bonduc* extract treatment reduced the elevated levels of blood ALT, AST, ALP, and bilirubin, which suggest to give protection and maintain the functional integrity of hepatic cells. *C. bonduc* extract provided protection against such paracetamol-induced liver damage. *C. bonduc* extract is a potential treatment.

## Activity Against Cataracts

Caesalpinia bonducella seed kernel ethanolic extract.

(L) Fleming possesses anticataract and antioxidant properties.

may be beneficial in preventing or slowing the progression of cataract.

The extract decreased opacity and MDA levels in the tissue while increasing catalase and SOD activity. Water soluble protein levels and total protein levels increased. 32

## Anti-inflammatory and analgesic properties

Oral administration of cbsce at varied dosages has consistent antinociceptive and anti-inflammatory effects in numerous models of pain and inflammation. The presence of triterpenoidal moieties in the seed coat extract can be attributed to the anti-inflammatory activity of the seed coat extract. Propose that CBSCE has potent antinociceptive action in the peripheral nervous system. 33 Caesalpinia 30 and 100 mg had a dose-dependent effect.

Flower extract from Bonduc. CBFEE revealed a substantial reduction in granuloma weight at 300 mg/kg, indicating that the extract conceals the proliferative stage. 35 Caesalpinia bonducella in water has analgesic properties similar to nonsteroidal anti-inflammatory medications. Caesalpinia bonducella in aqua form anti-nociceptive activity on hot plate and acetic acid triggered squirming test may have both centrally and peripherally mediated anti-nociceptive capabilities. 34

## Antipyretic properties

Caesalpinia bonducella seed kernel extract significantly reduced Brewer's yeast-induced pyrexia in rats. In both the hot plate and tail flick procedures, the concentrate provided effective central analgesia. In conclusion, the study found that the ethanolic extract of Caesalpinia bonducella seed kernel has high antipyretic and antinociceptive properties, approving its use in the treatment of pain and pyretic disorders.

## Antibacterial and antimicrobial properties

The disc diffusion technique was used to determine the antibacterial activity of methanol extract, ethyl acetic acid, chloroform, and pet. ether sections of C. bonducella leaves. The chloroform part was more effective against practically all bacteria at all three concentrations (300, 500, and 800 g/disc). The bactericidal activity of the methanol extract was the lowest, followed by the ethyl acetic acid and pet. ether portions. C. Bonducella crude extract, ethyl acetic acid, pet. ether, and chloroform fractions exhibit superior antibacterial activities against certain pathogens at different dosages. 38 The seed extracts of Caesalpinia bonducella shown considerable antibacterial activity with low MIC values. 39 Simin et al. showed antimicrobial activity of Caesalpinia bonduc (L.) Roxb. seed separates and bondenolide. The A methanol extract, ethylacetate division, and water soluble fraction of the methanol concentrate of Caesalpinia bonduc (L.) Roxb were tested for antibacterial and antifungal activity, as well as a phytotoxicity experiment of the recently identified diterpene bondenolide (1). 40 Extracts' antibacterial activity demonstrated that Caesalpinia bonduc is a potentially promising source of bioactive metabolites for the development of broad range antibiotics. 41

They were given legitimacy in Pakistan's traditional medical system. 46

The anthelmintic activity of Caesalpinia bonducella leaves against Phertima posthuma and Ascardia galli was investigated. In the bioassay, several concentrations were employed. Anthelmintic action was observed in both extracts. 47

## Virucidal action

Saravanan KS et al. demonstrated mosquito larvicidal activity of various concentrates of leaves and fixed oil from Caesalpinia bonduc (L) Roxb. seeds. A preliminary study was conducted to determine the efficacy of petroleum ether, ethanolic, and aqueous extracts of dried leaves and fixed oil from Caesalpinia bonduc seeds (L). Roxb was tested at various doses against 4th instar culex quinquefasciatus larvae.

In the presence of a 1% concentration of P.ether and an ethanolic concentrate of leaf, despite being 55 percent in a 2.5 percent aqueous concentrate concentration and 92.6 percent in a 2.5 percent fixed oil concentration. The key component responsible

for death must be separated in order to develop a potential larvicidal product that is cost-effective, non-polluting, and environmentally benign. 48

### Antifilarial properties

In animal models, *C. bonducella*-seed extract demonstrated microfilaricidal, macrofilaricidal, and female-sterilizing adequacy against *L. sigmodontis* and microfilaricidal and female-sterilizing viability against *B. malayi*, demonstrating the plant's capability in providing a lead to new antifilarial tranquillize development.

### Activity Against Malaria

Cold ethanol, aqueous, and hot ethanol extracts of *Caesalpinia bonducella* seeds inhibited *P. falciparum* growth by 56%, 65%, and 76%, respectively. It promotes *C. bonducella*'s antimalarial activity. 50 Three novel cassane furanoditerpenoids (13) were isolated from *Caesalpinia bonduc* seed kernels, together with known cassane diterpenes. Compounds 1-3 had significant antimalarial activity against the multidrug resistant K1 strain of *Plasmodium falciparum*. 51 CbTI-2 was extremely toxic to erythrocytic attack of *P. falciparum* merozoites and inhibited these activities in a dose-dependent manner. way. CbTI-2 also had a negative effect on the growth and proliferation of *P. falciparum*. 52

### Activity against feed

The antifeedant activity of *C. bonduc* extracts in hexane, chloroform, and ethyl acetic acid was concentration dependant.

53 *Helicoverpa armigera* (Hubner) is a polyphagous pest that attacks over 200 crop varieties in India. *Caesalpinia crista* seed extracts were tested in the laboratory against *Helicoverpa armigera* (Hubner). The extracts demonstrated potent antifeedant and growth inhibition properties. Methanolic extract causes the most antifeedance among the *Caesalpinia crista* extracts, followed by hexane extract, ethyl acetate extract, butanol extract, and aqueous extract. 54 Antidiarrheal activity: A part of the methanol, ethyl acetic acid, chloroform, and petroleum ether concentration of *C. bonducella* leaves In experimental rats, 400 mg/kg inhibited castor oil-induced diarrhoea in a concentration-dependent manner. 55 Antiulcer Properties: The aqueous extract of *C. bonducella* was shown to be particularly effective in the treatment of ulcers and to have antisecretory properties. This plant has the potential to be used to treat stomach issues. The extract also significantly reduced stomach volume, total and free acidity, and increased gastric fluid pH. The presence of saponins, alkaloids, triterpenes, flavonoids, steroids, and tannins was discovered in the aqueous extract of CBD, and flavonoides were discovered to have anti-ulcer action. *C. bonducella* (Linn.) Flem. leaf methanolic extract has significant anti-ulcer action. 56

### Antispasmodic properties

According to Khan HU et al., the antibacterial, antifungal, antispasmodic, and Ca<sup>++</sup> antagonist actions of 57 *Caesalpinia bonducella*

### Anticonvulsant properties

Pet.ether extract of *Caesalpinia bonduc* (PCMB) at medium and higher dosages (600 & 800mg/kg) shown considerable anti-inflammatory activity.

convulsive effect as evidenced from increased onset time of seizures and decreased duration of tonic-clonic seizures. PECB at 600 and 800mg/kg had deferred the beginning of clonus seizures and diminished the span of tonic extensor stage and offered a dose-dependent protection and exhibited significant anticonvulsant activity. The anticonvulsant effect produced by PECB might be through suppression of the action of strychnine on glycine inhibitory mechanisms. Confirmed the anticonvulsant activity of PECB in mice.<sup>58</sup> **Anxiolytic activities**

In Stair-case model, all the 3 dosages i.e low, medium and high 400, 600 and 800mg/kg of PECB had demonstrated a good and dose dependent Anxiolytic action by increasing the quantity of steps climbed with no tremendous impact on rearings by all these three dosages. So also in EPM test medium and high dosages, however not the low portion of PECB had significantly increased both number of entries and time spent in open arms and diminished in number of entries and time spent in shut arms. In Hole-board model, medium and high portions 600 and 800mg/kg yet not the low dosage 400mg/kg of PECB had significantly increased the number, latency and the time of head dipping but not the rearings. Anyway in LDT demonstrate high dosages 800mg/kg of PECB had essentially shown anxiolytic action by enhancing time spent, number of crossings in light compartment and diminished the time spent in dull compartment and diminished the quantity of rearings in both light and dim compartments. In OFT models, medium and high dosages 600 and 800mg/kg yet not the low portion 400mg/kg of PECB had significantly increased absolute motion, central locomotion, number of grooming yet the immobility time has definitely reduced.<sup>59</sup> The medium and high doses of PECB, but not the low part, significantly increased the number of entries and time spent in open arms while decreasing the number of entries and time spent in shut arms. In the Hole-board model, medium and high doses of PECB (600 and 800mg/kg, but not 400mg/kg) significantly enhanced the quantity,

latency, and time of head dipping but not the rearings. However, large doses of PECB (800mg/kg) in LDT demonstrated anxiolytic activity by increasing time spent, number of crossings in bright compartment, decreasing time spent in dull compartment, and decreasing the amount of rearings in both light and dim compartments. In OFT models, medium and high doses of 600 and 800mg/kg are still used. not the little part PECB 400mg/kg substantially enhanced absolute motion, central locomotion, and grooming frequency while decreasing immobility time. 59

### **Neuroprotective properties**

In comparison to the reference medicine, the methanolic and aqueous extract of *Caesalpinia bonducella* (Roxb) shown considerable neuroprotective efficacy (Vitamin E). *Caesalpinia bonducella* (Roxb) extracts exhibit remarkable antioxidant activity due to possible 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. 60

### **Nootropic Action**

The effectiveness of dried seed kernels of *Caesalpinia crista* extract as a learning and memory enhancer was investigated. Scopolamine-induced amnesia in mice was alleviated by an aqueous extract of dried seed kernels of *Caesalpinia crista*. The exteroceptive behavioural paradigms used were the radial arm maze and the Morris water maze paradigm. Aqueous extract of dried seed kernels of *Caesalpinia crista* linn. is compared to the common medicine piracetam in mice with scopolamine-induced amnesia. The statistical analysis was used to test the Morris water maze model for learning and memory and the radial arm maze model for learning and memory retention. 61

### **Hepatoprotective properties**

The mice given a hydro ethanol extract of *Caesalpinia bonducella* leaves displayed liver protection against the toxicant, as seen by the presence of normal hepatic cords, the absence of necrosis, and reduced fatty invasion. The hydro alcoholic extract is an effective herbal hepatoprotectant. This activity might be explained by the presence of flavonoid and phenolic substances as secondary metabolites in the leaf extract. 62 The combination of CB extract and CCl<sub>4</sub> considerably relieved the condition by lowering serum AST, ALT, and ALP levels. , bilirubin, and total protein levels were considerably higher in the preventative and curative groups, respectively. This demonstrates the CB's efficiency in preserving the structural and functional integrity of the hepatocellular components. The histological findings also suggest that therapy with CB extract can repair the liver architecture in rats with CCl<sub>4</sub>-induced liver cirrhosis. CB treatment can prevent/repair CCl<sub>4</sub>-induced fatty degeneration, necrosis, and fibrosis of the liver. 63

### **Hypocholesterolemic activity**

EESKCB (ethanolic concentration of *Caesalpinia bonducella* seed kernel) with a high fat diet resulted in a substantial reduction in all lipid parameters except HDL. The extract's lipid-lowering action might be attributed to the presence of triterpenoids, polyphenols, flavonoids, and saponins. Sitosterol, a component of *Caesalpinia bonducella* seed kernel, hasIt has been claimed that it has hypocholesterolemic properties by blocking intestinal cholesterol absorption and speeding the breakdown of cholesterol to bile acid. The extract likely prevented body weight gain by restoring gut microbiota composition and thereby decreasing hepatic lipogenesis and lipoprotein lipase activity. 64

### **Anticancer properties**

The anticancer efficacy of a methanol extract of *Caesalpinia bonducella* FLEMING (*Caesalpinaceae*) leaves (MECB) against Ehrlich ascites carcinoma (EAC)-bearing Swiss albino mice was investigated. This study looks at the effect of MECB on the formation of transplantable mouse tumours, the life span of EAC-bearing hosts, the haematological profile, and biochemical markers such as lipid peroxidation (LPO), glutathione content (GSH), superoxide dismutase (SOD), and catalase (CAT) activities. MECB resulted in a significant (P0.01) decrease in tumour volume, packed cell volume, and viable cell count, as well as a delay in the life expectancy of EACtumor-bearing mice. MECB demonstrated substantial anticancer and antioxidant activity in EAC-bearing mice. 65 Immunomodulatory properties

*Caesalpinia bonducella* is an immunostimulant that activates both targeted and nonspecific immunological systems. Ethanolic seed concentrate administration *Caesalpinia bonducella* significantly increased total WBCs, RBCs, haemoglobin, and platelet count while also reversing the myelosuppressive effects of cyclophosphamide. 66 The immunomodulatory capability of an ethanolic extract of *C. bonducella* seed seed generated a significant increase in % neutrophil adherence to nylon fibres. *C. bonducella* has immunomodulatory properties and can be utilised to avoid autoimmune diseases. 67 The effect of an aqueous concentrate of *C. bonducella* seeds on cell intervened and humoral immune system components in rats resulted in an increase in hemagglutinating antibody titer and a change in delayed-type hypersensitivity, indicating that the concentrate could be a promising immunostimulatory agent. 68 The immunomodulatory potential of *Caesalpinia bonducella*

ethanolic seed concentrate (200-500 mg/kg) was evaluated by oral administration. Increase in the percentage of neutrophils adhering to nylon filaments. It also revealed a dose-dependent rise in antibody titre levels. 69

### Diuretic action

*C. bonduc* aqueous and methanol concentrates both showed a dose-dependent increase in urine discharge. When compared to the methanol extract, the aqueous concentration produced the greatest increase in urine excretion at 300 mg/kg. The study provides a mathematical foundation for explaining the Moroccan population's historic usage of *C. bonduc* as a diuretic agent. 70

### Anti-diabetic properties

Both polar concentrates (ethyl acetic acid and aqueous) and glibenclamide displayed good hypoglycemic effects in diabetic rats, as well as correcting diabetes-induced alterations in lipid and liver glycogen levels. Concerning the non-polar concentrates, the ether extract exhibited aThe petroleum ether extract failed to demonstrate any antidiabetic activity. 71 Watery, ethanol, and chloroform extracts provided adequate protection and reduced blood glucose levels to normal in a glucose tolerance test. The biggest decrease in blood glucose was reported after 3 hours in alloxan-induced diabetic rats at a dosage level of 250 mg/kg body weight. The degree of confidence in long-term therapy of alloxan-induced diabetic rats was measured by evaluating blood glucose, triglycerides, cholesterol, and urea levels on day 0, 3, 5, 7, and ten. 72

### Activity against spermatogenesis

Oral administration of *Caesalpinia bonduc* (L.) Roxb. (Caesalpiniaceae) aqueous concentrate resulted in a 40% drop in sperm count. Normal sperm thickness gradually decreases from 27.63 (Million/MI) in charge to 25.11, 20.63, and 16.63 at doses of 50, 100, and 150 mg/kg, respectively. The results showed that the seed extract considerably reduced sperm density and that rats' antispermatogenic activity increased with increasing dosage concentrations (9.06%), (25.29%), and (39.79%). 77

### The Sperm Effect

Gradually increasing dosages of *C. bonduc* alcoholic seed extract caused morphological alterations in albino rat sperm. The impact might be the consequence of general disturbing influences in proteins and changes in the cauda epididymal milieu, most likely as a result of testosterone deficiency caused by *C. bonduc* treatment. 78

### Antiestrogenic properties

According to the findings of Kanchan et al., alcohol seed concentrate of *Caesalpinia bonduc* exhibits antiestrogenic properties, probably working through suppression of oestrogen production.

79 Abortion-Inducing Activity In rural India, the seeds of *C. bonduc* are historically employed in female fertility control. The leaves are used as an emmenagogue and to smooth out the delivery in pregnant women. The combination of *C. bonduc* seed powder and sesame oil causes abortion. It suggests that the herb possesses abortifacient properties. 80

### Fertility inhibitory action

*Caesalpinia bonduc* administration has significant antiimplantation, anti-estrogenic, abortion and anti-estrogenic action, antiovarian activity. *Bonduc Caesalpinia* Roxb. Linn. Root bark (ERb) can be utilised to induce sterility, i.e.

## CONCLUSION

According to many scientific studies on *Caesalpinia bonduc*, the plant has a tremendous biological potential. Several chemicals found in the plant have a wide range of pharmacological and therapeutic properties. More study and assessment are required to isolate and identify the many compounds found in the plant, which will be employed for a variety of human welfare applications in the near future. Under the WOS-A initiative, the Department of Science and Technology of the Government of India provided a search grant.

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