# Phytochemical investigation and evaluation of *Caesalpinia bonducella* leaves hydro alcoholic extracts

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## *Abstract*
*The leaves of the Caesalpinia bonducella plant have long been used to treat tumours, inflammation, and liver conditions. Additional medical properties of the plant include anticonvulsant, anti-inflammatory, anti-asthmatic, nematocidal, antihyperglycemic, antipyretic, antidiuretic, anthelmintic, and antibacterial activities. Recent research has shown that the methanol extract of C. bonducella leaves possesses hepatoprotective, anti-inflammatory, and antipyretic action. The objective of the current study is to evaluate pharmacognostic criteria, such as an initial phytochemical examination of Caesalpinia bonducella. However, the results shows that the C. bonducella consist of mainly phenolic, alkaloids, saponins and flavonoids.*

***Keywords:-*** *Caesalpinia bonducella, pharmacognostic, phytochemicals, screening, alkaloids, flavonoids.*

## 1. Introduction

Ayurveda, Siddha, and Unnani are some of the traditional healing traditions that are now being studied by individuals after decades of intense fascination with modern medicine. This is because synthetic medications have negative side effects. Especially in underdeveloped nations, herbal medicines play a significant part in healthcare systems. A startlingly wide

concept of medicinal plants is present in ancient Indian literature, which views "all" plant parts as possible sources of therapeutic compounds.(1) However, the absence of documentation and strict quality control has been a major barrier to the acceptance of alternative medicines in affluent nations. Research studies done on conventional drugs need to be documented.(2) With this background, it becomes crucial to work toward standardizing the plant material that will be employed in medicine. Stepwise pharmacognostic research can be used to standardize a process.(3) These investigations aid in the identification and verification of plant material. To ensure repeatable quality of herbal medicine, which will contribute to its safety and effectiveness, correct identification and quality assurance of the beginning ingredients are prerequisites that cannot be ignored. Plant material is standardized using straightforward pharmacognostic methods such as morphological, anatomical, and biochemical features.(4)

The prickly shrub Caesalpinia bonducella, also called Nata karanja in Hindi, is found all throughout the drier regions of India, Myanmar, and Sri Lanka. This plant's leaves have historically been used to cure liver disorders, inflammation, and tumors.(5,6) The plant also has a wide range of additional medicinal qualities, including anticonvulsant, anti-inflammatory, anti-asthmatic, nematocidal, antihyperglycemic, antipyretic, antidiuretic, anthelmintic, and antibacterial effects. The methanol extract of C. bonducella leaves has recently been demonstrated to have hepatoprotective, anti-inflammatory, and antipyretic activity.(7–13) The current study's goal is to assess pharmacognostic criteria like preliminary phytochemical analysis of Caesalpinia bonducella.

## 2. Material and methods

### 2.1. Plant materials

The plant's fresh leaves were procured in Sambhal, Uttar Pradesh, India, during the month of July, and Dr. Sunita Garg, director of the Raw Materials Herbarium & Museum (RMHD), Delhi, validated them. The plant specimen was donated to the National Institute of Science Communication and Information Resources (CSIR-NISCAIR), Raw Materials Herbarium & Museum (RHMD), New Delhi. At the same institution, a voucher specimen number (ARFC/SOP/IAEC/01/18) was given. To eliminate the surface impurities, the gathered leaves were washed under running water from the faucet. Under shade, the plant materials were air dried.

### 2.2. Preparation of leave extracts

The dried leaves were ground into a powder and extracted using a Soxhlet device in ethanol at 600–800°C. Finally, a rotating vacuum evaporator was used to evaporate the extracted samples. The sequential solvent extraction procedure produced the extract yield. The yield was discovered to be (12%) for ethanol extracts. For additional research, dried extracts were employed

## 3. Results

### 3.1.phytochemical screening

The plants consist of secondary metabolites, it can alkaloids, proteins, carbohydrates, amino acids, flavonoids or phenols. Hence, the Caesalpinia bonducella was evaluated for the presence of the different secondary metabolites.

#### 3.1.1. Test for alkaloids

| TEST | OBSERVATION | INFERENCE |
|---|---|---|
| **Dragendroff,s test:** To small amount of drug extract, add Dragendroff,s reagent(potassium bismuth iodide Solution). | Give reddish brown colour or precipitate | Absent of Alkaloids |
| **Mayer's test:** To small amount of drug extract, add Mayer's reagent(potassium mercuric iodide Solution ). | Give cream colour or precipitate | Absent of Alkaloids |
| **Wagner's test:** To small amount of drug extract, add, Wagner, s reagent(iodide potassium iodide Solution). | Give brown or reddish brown colour or precipitate | Presence of Alkaloids |
| **Hager's test:** To small amount of drug extract, add Hager,s reagent (saturated solution of picric acid). | Give yellow precipitate | Absent of Alkaloids |
| **Tannic acid test:** To small amount of drug extract, add Tannic acid test. | Buff colour | Absent of Alkaloids |

### 3.1.2. Chemical tests for Glycoside by Ethanolic Extract

| | | |
|---|---|---|
| **Legal test:** To small amount of drug extract and glycoside in 1ml pyridine sodium nitrogen amide solution add 1ml NaoH. | Pink to red colour is formed | Absent of Glycoside |
| **Keller-Killiani test:** To small amount of drug extract with 1ml glacial acetic acid containing traces of chloride, 1ml conc. Sulphuric acid. | Reddish-brown colour and upper layer bluish green. | Presence of Glycoside |

### 3.1.3. Chemical tests for Carbohydrate by Ethanolic Extract

| | | |
|---|---|---|
| **Fehling solution test:** 2ml of drug extract and HCL. Reaction mixture is neutralized by addition of NaoH solution and Fehling solution1 & 2. | Red precipitate is produced on heating. | Presence of Carbohydrates |
| **Benedict's test:** 2ml of drug extract add Benedict's reagent and heated on water bath. | Green , yellow or red depending on concentration of reducing sugar | Absent of Carbohydrates |
| **Molish test:** 2ml of drug extract containing α-naphthol concentrated $H_2SO_4$ is add. | Purple ring is formed on junction below upper layer | Presence of Carbohydrates |

### 3.1.4. Chemical tests for Flavonoids

| | | |
|---|---|---|
| **Shinoda test :** 2ml of drug extract add few drops conc. HCL and 0.5 g of magnesium tuning | Pink colour | Presence of Flavonoids |
| **Sulphuric acid:** 2ml of drug extract add few drops conc. and Sulphuric acid. | Reddish brown | Absent of Flavonoids |

### 3.1.5. Chemical tests for Phenols

| | | |
|---|---|---|
| **Ferric Chloride Test:**1ml Extracts with 3-4 drops of ferric chloride | Bluish black colour indicates | Presence of Phenols |
| **Lead acetate solution:** 2ml of drug extract add 1ml of Lead acetate solution | Black colour | Presence of Phenols |

| | | |
|---|---|---|
| **Gelatin solution:** 2ml of drug extract add 1ml of gelatin solution | Bluish black | Absent of Phenols |
| **Acetic acid solution:** 2ml of drug extract add 1ml of Acetic acid sol. | Green colour | Presence of Phenols |

### 3.1.6. Chemical tests for Protein by Ethanolic Extract

| | | |
|---|---|---|
| **Millions Test**: 1ml Extracts add few drops of Millions reagent | Yellowish color | Presence of Protein |
| **Xanthoprotein Test:** 1ml Extracts add few drops of conc. Nitric acid | Yellow colour | Presence of Protein |

### 3.1.7. Chemical tests for Amino acid by Ethanolic Extract

| | | |
|---|---|---|
| **Ninhydrin Test:** 1 ml extract add 0.25% w/v Ninhydrin reagent and boiled for few minutes. | Blue colour indicates | Presence of Amino acid |

## 4. Discussion

In the past forty years, scientists have been eager to assess a variety of plant medicines utilised in traditional medicine. It's because of their unique healing abilities, beneficial actions, and non-toxic results. Hence, from this view *Ceasalpinia bounducella* was evaluated for its pharmacognistic properties like phytochemical screening. Interestingly, Phytochemical screening of ethanolic extracts *Ceasalpinia bounducella* has shown the presence of various phytochemical constituents, mainly phenolic, alkaloids, saponins and flavonoids. Hence, these findings suggests that the phytochemicals obtained from the *Ceasalpinia bounducella* can be utilized in herbal drugs. However, pharmacological studies are still required to establish the validation for it.

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