



## Acute Toxicity Study of *Caesalpinia Bonducella* Leaves

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### ABSTRACT

The study was planned and designed to examine the acute toxicity study of leaves powder of *Caesalpinia bonducella*. Leaves were collected from Avsari Forest Park, Pune dried in shade to a constant weight and grinded by high power electric mixture and sieved. The acute toxicity study of leaves powder is carried out as per OECD guideline in Swiss mice weighing 35 to 50 gm. The dose of 2, 4, 6, 8 and 10gm/kg body weight plant material were administered orally in the form of aqueous slurry. The groups were almost continuously observed for mortality and behavioral changes during first 24 hrs and then daily for fortnight. The observations of changes in body weight, food and water intake as well as cage side observations were reported. There was no abnormality observed in any of these three groups. The results provide evidence that *Caesalpinia bonducella* plant material was found to be nontoxic in nature.

**Keywords:** *Caesalpinia bonducella*, Fever nut, Kantikaranja.

### INTRODUCTION

This plant is claimed to be styptic, purgative and anthelmintic<sup>1</sup> and cures inflammations. It is useful in colic, malaria, skin diseases and leprosy. An ointment is made from the powdered seeds with castor oil and applied externally in hydrocele and orchitis. The seeds are considered tonic, ferifuge, anthelmintic, and specific in the treatment of hydrocele. The oil from the seeds is used in convulsions and paralysis. The powdered seeds were mixed with equal part of pepper powder to malaria patients and were found to possess feeble antiperiodic properties. In malignant malaria, they did not do any good. The seeds are ground in water and given internally in snake-bite. The seeds are not an antidote to snake-venom<sup>2</sup>. The seed and long pepper powders taken with honey gives good expectorant effect. In West Indies, the roasted seeds are used as antidiabetic. Decoction of roasted kernels was used in asthma. A cake made of 30 grains of powdered kernels, fried in ghee taken twice a day is a valuable remedy in cases of acute orchitis, ovaritis and scrofula<sup>1, 3-5</sup>. In La Reunion and Madagascar, the roots are considered febrifuge and anthelmintic, they are much used as an astringent in leucorrhoea and blennorrhagia. In Guinea, a decoction of the root is prescribed in fever. The root-bark is good for tumours and for removing the placenta.<sup>1</sup> Bark of root possesses number of properties like febrifuge and anthelmintic etc. In Jamaica, it is used as rubefacient and as a local application for sores. In Himachal Pradesh, the roots are used in intermittent fever and diabetes.<sup>1, 3-5</sup> The juice of leaves is anthelmintic; good in elephantiasis and small pox; destroys the bad odour due to perspiration. In disorders of liver, the tender leaves are considered very efficacious. In Cochin China they are reckoned as a deobstruent and emmenagogue; and an oil expressed from them is given in convulsions, palsy and similar complaints. In Malsya, the young leaves

are used in intermittent fevers, and for expelling intestinal worms. In Ceylon, they are applied for toothache, and they are also given for worms in children. In Guinea, the boiled leaves are used as a gargle for sore throat.<sup>1, 3</sup> Leaves ground with onion, if applied on plague boils gives good relief. Finely powdered leaves are prescribed as a uterine tonic after child birth. The leaf extract with asafetida is prescribed in cases of indigestion. The flower is bitter cures Kapha and Vata. The ash is used in ascites.

Toxicity is the fundamental science of poisons. The organization for Economic and Development (OECD) mentioned acute toxicity as the advance effect occurring within a short time of oral administration of a simple dose of a substance or a multiple doses given within 24 hours. Phytochemical interactions of poisons lead to injury or death of living tissues. Toxicology is like science and an art like medicine. It includes observational data gathering and data utilization to predict outcome of exposure in human and animals. The ancient humans categorized some plants as harmful and some as safe.<sup>6-9</sup>

All organisms are exposed constantly and unavoidably to foreign chemicals or xenobiotics, which include both manmade chemicals such as drugs industrial chemicals pesticides, pollutants pyrolysis products in cooked foods, alkaloids secondary plant metabolites, and toxins produced by moulds, plants and animals.<sup>10-12</sup> Poisons are any agent capable of producing a deleterious response in a biological system, seriously injuring function or producing death. Toxicologists usually divide that exposure of animals into four categories which are acute, sub acute, sub chronic and chronic. The aim of the present work is to study the toxic effect of *Caesalpinia bonducella* leaves powder.



## MATERIALS AND METHODS

*Caesalpinia bonducella* leaves were collected from Avsari Forest Park (Pune), Maharashtra, India. After collection of the required quantity of plant material, it was carefully segregated, cleaned and grinded by mortar and pestle to a very fine paste. The plant material was then used for study as per the study protocol given in table 1.

**Table 1:** Study Protocol

<b>Name of the study</b>	Acute toxicity study
<b>Test material</b>	<i>Caesalpinia bonducella</i> plant material.
<b>Animal model</b>	Albino Swiss Mice
<b>Animals procured from</b>	Raj Biotech (INDIA) Ltd., Pune
<b>Sex</b>	Male and Female
<b>Weight range of animals</b>	Between 30 to 50 g
<b>No. of dose groups</b>	Four groups
<b>Animals per group</b>	1 male and 1 female
<b>Route of administration</b>	Intragastric administration with the help of gavage No. 16
<b>Dose volume</b>	2.0 ml per animal
<b>Vehicle</b>	Distilled water
<b>No. of administrations</b>	Single
<b>Concentration of dose</b>	2, 4, 6, 8 and 10g/Kg body weight plant material
<b>Study duration</b>	Acclimatization for 14 days, one day drug administration and 14 days observation period including holidays
<b>Parameters observed</b>	Cage side observations, daily food and water intake, daily body weight and daily mortality record etc

**Table 2:** Composition of Feed

Name	Percentage
<b>Crude Protein</b>	20 - 21 % minimum.
<b>Ether Extractive</b>	04 - 05 % minimum.
<b>Crude Fiber</b>	04 % maximum.
<b>Ash</b>	08 % maximum.
<b>Calcium</b>	1.2%.
<b>Phosphorus</b>	0.6 % minimum.
<b>NFE</b>	54 %.
<b>ME Kcal/Kg</b>	3600.
<b>Pallet Size</b>	12 mm.

### Animal Maintenance

All animals were housed in polyurethane cages. The cages were provided with wheat husk bedding and were cleaned daily. The animals were provided with drinking water *ad libitum* and were fed on commercially available Mice feed supplied by Amrut Feed. The specifications of the feed are listed below in table 2. The feed was enriched with stabilized vitamins such as Vit. A and D<sub>3</sub>, Vit. B<sub>12</sub>, Thiamine, Riboflavin, Folic acid and supplemented with all minerals and microelements.

Measured quantities of water and feed were supplied daily in each cage. The consumption of water and food was recorded from the amount of water left in the feeding bottles and from the amount of feed left in the feed hopper.

## RESULTS AND DISCUSSION

### Cage Side Observations

The examination of the behavior of animals was reported by recording general observations of each animal on a daily basis from the stage of dosing to the end of the study. Any changes or abnormalities recorded could be an indication of toxicity. The test animals at all dose levels of leaves powder and methanol extract showed no significant changes in behavior before and after the administration. Table III shows the dosage regime for *Caesalpinia bonducella* Table IV shows the general cage side observations for all parameters studied. Table V shows the mortality record for whole plant powder of *Caesalpinia bonducella*.

**Table 3:** Doses Regime

Sex	Dose g/Kg Body weight	No. of animals used	Total Vol. administered in cm <sup>3</sup>
Male	2	1	2
Female	2	1	2
Male	4	1	2
Female	5	1	2
Male	6	1	2
Female	6	1	2
Male	8	1	2
Female	8	1	2
Male	10	1	2
Female	10	1	2

**Table 4:** Cage Side Observations for All Animals

Parameters	Cage Side Observations
Condition of the fur	Normal
Skin	Normal
Subcutaneous swellings	Nil
Abdominal distension	Nil
Eyes – dullness	Nil
Eyes – opacities	Nil
Pupil diameter	Normal
Ptosis	Nil
Colour & consistency of the faeces	Normal
Wetness or soiling of the perineum	Nil
Condition of teeth	Normal
Breathing abnormalities	Nil
Gait	Normal

**Table 5:** Mortality Record for plant material as aqueous slurry

Group	2 g/Kg	2 g/Kg	4 g/Kg	4 g/Kg	6 g/Kg	6 g/Kg	8 g/Kg	8 g/Kg	10 g/Kg	10 g/Kg
Sex	M	F	M	F	M	F	M	F	M	F
Hr. 1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 2	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 4	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 2	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 4	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 5	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 6	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 7	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 8	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 9	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 10	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 11	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 12	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 13	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Day 14	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Mortality	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

### Body Weight Changes

Body weight is an important factor to monitor the health of an animal. Loss in body weight is frequently the first indicator of the onset of an adverse effect. A dose, which causes 10% or more reduction in the body weight, is considered to be a toxic dose. It is considered to be the dose, which produces minimum toxic effect, irrespective of whether or not it is accompanied by any other changes. All the animals from treated groups did not show any significant decrease in body weights for all the 14 days as compared with the zero day values. There was no significant change in food and water intake of the test animals at all dose levels of the plant material and extract for all days.

### Mortality

Mortality is the main criteria in assessing the acute toxicity (LD<sub>50</sub>) of any drug. There was no mortality recorded even at the highest dose level i.e. 8g/K body weight plant material of *Caesalpinia bonducella*.

### CONCLUSION

From the results of this study, it is observed that there is no change in body weight, food and water consumption by the animals from all dose groups (2 g/Kg body weight to 10mg/Kg body weight), There was no mortality recorded even at the highest dose level i.e. 10g/ Kg body weight fresh plant material, which proves that *Caesalpinia bonducella* plant material have no any significant toxic effect in Swiss mice.

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