

## JATROPHA CURCAS POISONING IN NORTH INDIA - A CASE SERIES

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### ABSTRACT

#### BACKGROUND

Jatropha curcas poisoning mainly through ingestion is becoming common now-a-days in countries like India, as there is global thrust for production of Jatropha oil as an alternate fuel, i.e. biodiesel. Rampant farming of the plant is posing threat to humans for accidental poisoning. It produces the symptom of burning sensation in the mouth and throat followed by vomiting, diarrhoea, abdominal pain, later dehydration and shock may lead to collapse of the patient. Most affected are children, as they are attracted by taste of fruits. Here, we present a case series of twelve children who ate Jatropha fruits and landed with above-mentioned signs and symptoms.

#### KEYWORDS

Jatropha curcas, Biodiesel, Crucin, Poisoning.

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#### BACKGROUND

Poisoning by eating fruits and seeds of Jatropha in children is not very often reported in Northern India. The plant often attracts children for its yellow fruits and sweet taste, though all parts of the plant are poisonous. Jatropha belongs to Euphorbiaceae family and is most widely available species.<sup>[1]</sup> Different regions have different names for Jatropha, in India the various local names are bagbherenda, jangli arandi and safed arand.<sup>[2]</sup> J. Caracas has been used in traditional human medicine and for veterinary medicine for over a long period of time (Duke, 1985).<sup>[3]</sup> In the past decade, interest in Jatropha seed oil for biodiesel production has propelled large scale J. Caracas plantations across Asia, Africa and South American countries.<sup>[4]</sup>

The plant is about 2 - 3 metre tall and has heart-shaped green leaves (Fig. 1). The flower is small and white in colour and the fruits are initially green and yellow to brown on ripening. Fruit contains black seeds, which are often 2 - 3 in number and oval in shape. The seed contains kernels and shells, kernel contain high protein (22% - 28%) and oil (54% - 58%).<sup>[5]</sup> Almost all parts of the plant are toxic including kernel, leaves, flowers, roots, buds and wood. It contains terpenes, lignans, alkaloids and cyclic peptides. Diterpenes derived from the plants has various activities like tumour promoting, anti-inflammatory, irritant, cytotoxic, anti-tumour, molluscicidal, insecticidal and fungicidal activities.<sup>[6]</sup>

On ingestion and the symptom starts with burning sensation in the mouth and throat followed by vomiting, diarrhoea, abdominal pain, later dehydration and shock may lead to collapse of the patient.

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#### CASE SERIES

We report cases of Jatropha poisoning presented to the J. N. Medical Hospital, Aligarh emergency with episodes of vomiting, diarrhoea and pain in the abdomen.

There were twelve children and all of them were having similar symptoms. Immediately, they were transferred to the Paediatric Emergency Unit and the Forensic Medicine Unit was called upon for the medico-legal evaluation.

During evolution, it was revealed that children were between 6 - 11 years of age, of which 2 were girls, consumed a green coloured fruit from a plant from their locality following which vomiting, diarrhoea and abdominal pain started. All the twelve patients were having signs and symptoms of dehydration, right from increased pulse rate, decreased blood pressure, cold extremities, sunken eye and dry tongue.

Fruit was brought by the parents with them and on inspection it was found to be of Jatropha (Fig. 2). Further on investigation, none of the parameters were found deranged including renal and liver functions. The patients were managed with IV fluids and symptomatically and were discharged later without any further event.



**Figure 1. J. Curcas Fruits with Leaves**



**Figure 2. J. Curcas Fruits with Seeds (Cut Section)**

### DISCUSSION

*J. curcas* is now-a-days cultivated in different areas of the world for its usefulness as biodiesel. It is mostly cultivated in South America, Africa and South East Asia. Its prevalence in urban area is not very well documented, but its availability as a wild shrub is not ruled out.<sup>[4]</sup>

The Central Salt and Marine Chemicals Research Institute (CSMCRI), a Government-owned Industrial Research Institute, is aiming to cultivate *Jatropha* plant for the production of biodiesel.<sup>[7]</sup> Despite its medicinal uses, the plant is harmful due to presence of toxalbumin called curcin, and cyanic acid.<sup>[8]</sup> Though all parts of the plant are poisonous, seeds have the highest concentration of curinolic acid content and thus very poisonous.<sup>[9]</sup> The adverse effects following consumption of seeds include vomiting, diarrhoea, abdominal pain and burning sensation in the throat. Vomiting and diarrhoea can set in within fifteen minutes of consumption. Acute abdominal pain is experienced about half an hour after the ingestion of the seeds. Circulatory collapse has also been reported and is said to be common in children.<sup>[10]</sup>

The *Jatropha* poisoning may be confused with organophosphorous poisoning, so it could be differentiated systematically and measuring acetyl cholinesterase levels in the plasma. The combination of vomiting, diarrhoea and meiosis resembles the clinical presentation of organophosphorous poisoning, which is one important differential diagnosis (Koltin et al).<sup>[11]</sup>

Various case reports have been published from Central and South India including the toxicity or poisoning of *Jatropha* species in humans is purely due to accidental consumption of seeds.<sup>[12,13]</sup> Toxicity or poisoning of the *Jatropha* species in human is purely due to accidental consumption of seeds. Most of the reports show the children are involved and most of the incidents were accidental in nature, but no fatality has been reported by *J. curcas* poisoning.

### CONCLUSION

- *J. curcas* is a potentially toxic plant found as a shrub may be found in urban localities.
- Children are often susceptible to toxicity due to accidental ingestion of fruit and seeds.
- Most of the patients are managed conservatively.
- No fatality has been reported so far.

### Prevention

- *J. curcas* has been looked upon as an important source of biodiesel, so its cultivation should have proper regulations and guidelines.
- Proper cultivation and disposal guideline should be laid down as its kernel may pose threat to toxicity to animal and human.
- Children should be made aware of the plant and its toxicity.
- Civic authorities should come up with proper guidelines and regular check of *J. curcas* growth in urban surroundings.

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