



## INDIGENOUS MEDICINAL PLANTS USED FOR TREATMENT OF DENGUE FEVER BY TRIBALS OF CHHATTISGARH (INDIA)

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### ABSTRACT

Dengue fever is the most prevalent mosquito transmitted viral infection affecting mortality and morbidity of billions of people across the world, specifically in the Tropics and sub-tropic regions, which has taken the Centre stage of tackling the dreaded diseases before the governments and the World Health Organization (WHO). Till now there is no particular approved vaccine or drug to counter the menace of the causative virus. As a consequence, the lookout for the new anti-dengue compounds from the indigenous medicinal plants has taken a great concern of necessity. The present paper deals with the indigenous medicinal plants used by the tribes of various regions of Chhattisgarh state for the treatment of Dengue fever. The tribals depend on the indigenous medicines for cure of surprisingly the dreaded Dengue fever. The herbal healers of these region use plant as a whole or the /plant parts of their suitable preparation as paste, powder, juice, decoction and extract for treating the ailment as per the Information collected from traditional tribal healers, baidya ,ojha, medicine men etc. Herbal healers and their patients who receive the treatment for the said ailment were enquired the local names, parts used and method of administration. Furthermore studies are suggested to validate the aforesaid claims to pave the path for herbal drug development for the treatment of such ailment.

**KEY WORDS:** Dengue fever, Anti-dengue agents, Herbal healers, Indigenous medicinal plants.



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## 1. INTRODUCTION

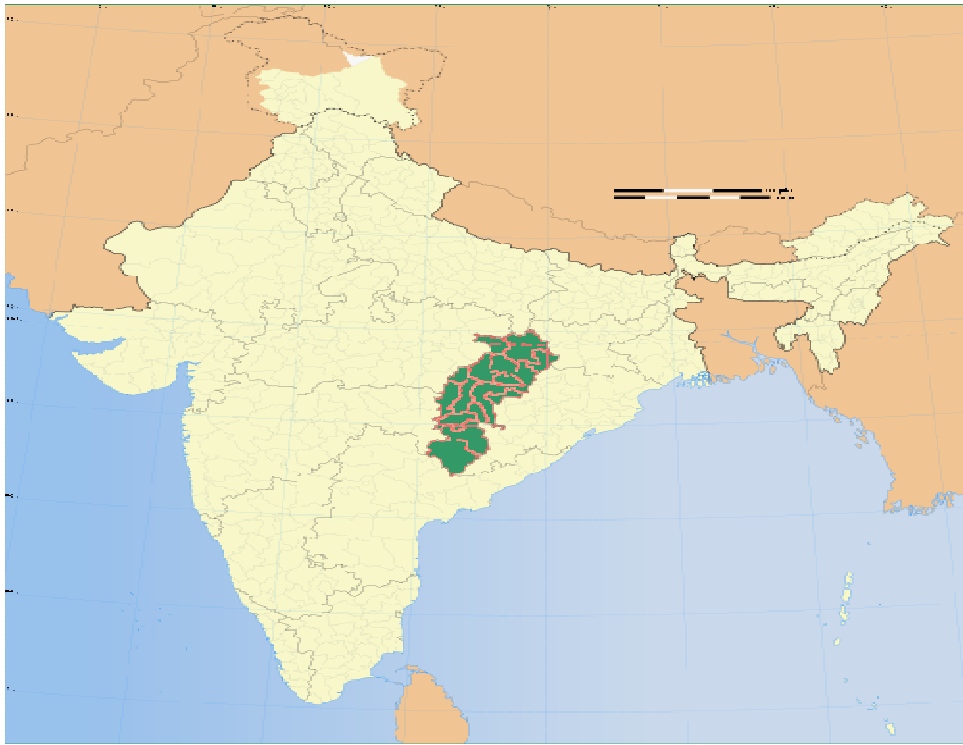
For present study area the data was collected randomly from across the parts of Chhattisgarh State. Chhattisgarh state is located between 17 to 23.7 degrees north latitude and 8.40 to 83.33 east longitude. Land use profile is an important index of human, social, cultural, and economic developments of a state. 42.80 percent of the State area is covered by forest area (59772.389 sq. km.) which is greater than the net area sown (48278 sq. km.) i.e. 35 %. Conferring the Chhattisgarh state a herbal state with a large store house of varieties of indigenous medicinal & aromatic plants to sustain the lives of a large population of forest dependent tribal communities, addressing their food, health and basic livelihood issues.<sup>[1]</sup> The exclusive number of plant species included in this exhaustive inventory of medicinal plants of Chhattisgarh state stands at 1525, representing 911 genera and 196 families approximately as per the data shown by the Chhattisgarh State Medicinal Plants Board (CGSMPB).<sup>2</sup> Traditional remedies are part of the cultural and religious life of the tribal. In this paper nature and range of indigenous medicinal plants used by traditional healers against the most dreaded disease Dengue is surveyed. Plants and plant based medicaments are the basis of many of the modern pharmaceuticals we used today for our various ailments.<sup>3,4</sup> Nearly 80% of the world populations rely on traditional medicines

for primary health care, most of which involve the use of plant extracts.<sup>5</sup> In India, almost 95% of the prescriptions are plant based the traditional system of Unani, Ayurveda, Homeopathy and Siddha.<sup>6</sup> Current studies reiterate that the indigenous medicinal plant diversity possesses a great potential of new anti-dengue compounds to answer the great menace if exploited proportionately.

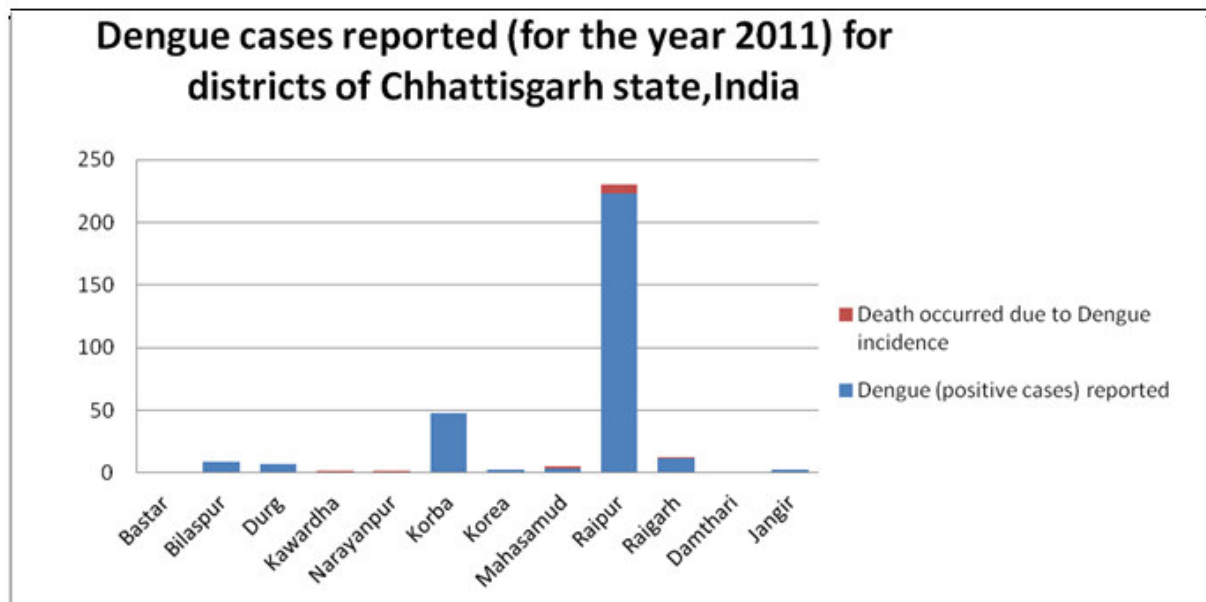
### 1.1 EPIDEMIOLOGY OF THE DISEASE

Dengue infection is predominant in the tropical and subtropical areas across the world, South east Asia and West Pacific areas are the most seriously affected. Dengue infection is caused by the infectious bite of the female *Aedes aegypti* mosquito carrying the *Flavivirus* responsible for the pathological condition. Its life cycle involves two hosts - mosquito as vector and targets are the humans and it breeds exclusively in the stagnant fresh water. Although the Chhattisgarh state (Fig-1)<sup>7</sup> does not fall under the Dengue high endemic state in India however the socio economical changes in the different areas the people are moving around different parts of India being infected by dengue virus and come to the state with high tourism and industrial value. Due to the increasing incidence of urbanization & industrialization the vector of dengue virus has been prevalent increasingly in the state. (Fig-2)(Table1)<sup>8</sup>

**Figure 1**  
**Chhattisgarh state location in the map of India**



**Figure 2**  
**Dengue cases reported (for the year 2011) for districts of Chhattisgarh state, INDIA.**



**Table 1**  
**Dengue cases reported (for the year 2011) for districts of Chhattisgarh state, INDIA.**

District Name	Dengue (positive cases) reported	Death occurred due to Dengue incidence
Bastar	1	0
Bilaspur	9	0
Durg	7	0
Kawardha	1	1
Narayanpur	1	1
Korba	48	0
Korea	3	0
Mahasamud	4	1
Raipur	223	7
Raigarh	12	1
Dhamthari	1	0
Janjgir	3	0
TOTAL	313	11

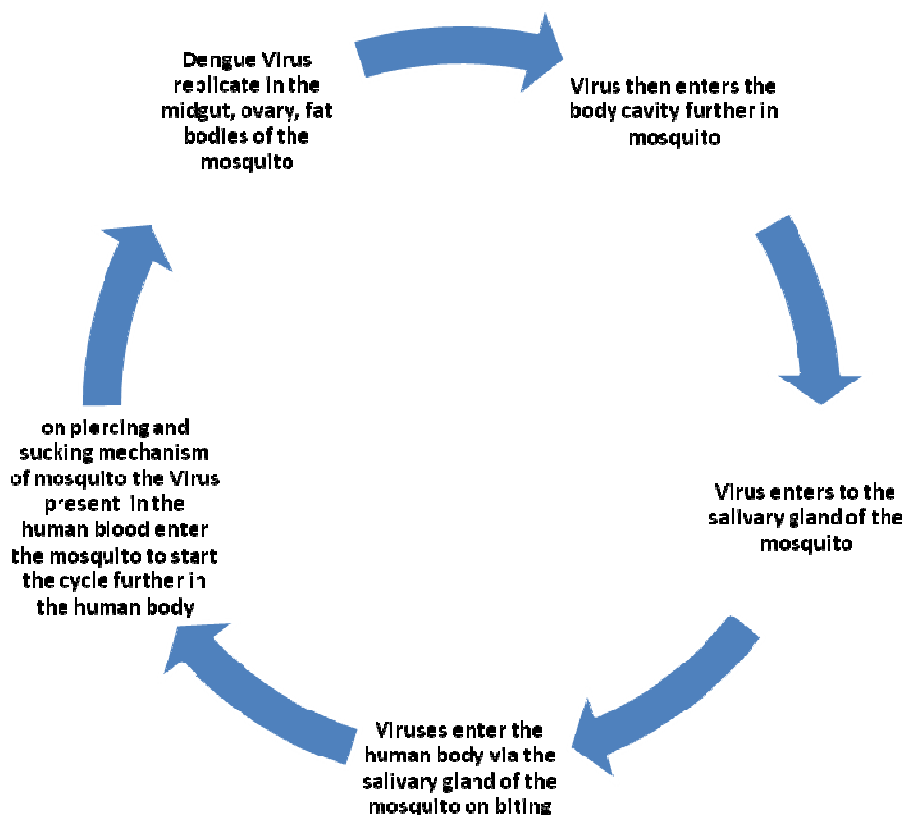
Dengue fever is caused by four closely related viruses. Each serotype represents distinct identified genotypes, representing the peculiar genetic variability of the dengue serotypes. Among them, the "Asian" genotypes of DEN-2 and DEN-3 are usually associated with the severe diseased condition accompanying the secondary dengue infections.<sup>9</sup>

### **1.2 TRANSMISSION CYCLE OF VIRUS INVOLVED IN THE DENGUE FEVER (DF)**

Mosquito acquires the virus on feeding the infected human blood, dengue virus incubation period varies from 8 to 10 days. Symptomatology of the virus infection usually begins 4 - 7 days after the mosquito bite and typically last for about 3 - 10 days. The symptom of DF (dengue fever) starts with temperatures fluctuations between 39 and 40 °C. Clinical findings of this classic dengue include nausea, vomiting, rashes, aches and pains, a positive tourniquet test, leukopenia, and the following

warning signs: abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy, restlessness, and lethal liver enlargement.<sup>10</sup> The presence of a warning sign shows severe dengue in a patient with aggravation of either plasma leakage leading to shock or fluid accumulation with respiratory distress, severe internal bleeding, or severe organ impairment such as elevated transaminases  $\geq 1,000$  IU/L, impaired consciousness, or heart impairment. Symptomatic dengue virus infections were classified according to the WHO guidelines as dengue fever, dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS, the most severe form of DHF). To identify a potential treatment against DENV (Dengue virus), it is imperative to understand the transmission cycle of the virus involved. Fig-3 Transmission Cycle of the Dengue Virus.<sup>11</sup>

**Figure 3**  
**Transmission Cycle of the Dengue Virus**



## 2. MATERIALS AND METHODS

### Study Area

Tribal people mostly inhabit in the deep forest area, and depend on the forest resources for their livelihood. Data collected from the tribal dominated areas. Major tribal group residing in study area are Bhunjia, Kamar, Muria, Maria, Halba, gonds etc. The present paper concentrates on the traditional medicine or Voucher specimens related to ethnobotanical uses were collected. These were identified with the help of herbarium and floras.<sup>12,13</sup> Data on uses were recorded in the field from experienced people. The present paper is outcome of an extensive field survey of different tribal areas of Chhattisgarh state comprising Jashpur, Korba, Kanker, Surguja, and Bastar districts were included during 20012-13 to collect information on medicinal uses of the plant species for the Anti Dengue properties.

### Methodology

During field work, interviews were conducted with local knowledgeable villagers, herbal healers called Vaidhraj, Baiga, Gunia or Sirha (local physicians in Indian System of Medicines), old women and tribal people as a patients, documentation and Identification of the that oral knowledge and identification of the local named medicinal plants has been made with the existing literature, the directory of Indian folk medicines were consulted to confirm the identification and medicinal properties, and consulted literature to confirm their scientific name and family for any referral needed for further validation study of their anti dengue medicinal properties.

### 3. RESULTS AND DISCUSSION

A study was carried out in the tribal inhabited localities of Jashpur, Korba, Kanker, Surguja, and Bastar districts with potential indigenous medicinal plants with their anti dengue medicinal value as enumerated in the following Table 2 being used by the traditional herbal healers (Vaidyas, ojhas, Guniyas or sirhas) have been documented. In the following observation given in Table 2, plants are arranged alphabetically by their identified botanical names, followed by the family and local name and their plant parts used to act as an anti dengue agent. It was observed that some uses described by the folk were not widely known or recorded.<sup>14</sup> Traditional medicinal Plants and plant based formulations

are the very basis of many of the modern pharmaceuticals products for our various ailments<sup>1</sup> for their subsistence<sup>[3]</sup> for primary health care, broadly comprising of plant extracts.<sup>4</sup> In India, almost 95% of the significant plant based prescriptions are enumerated in the Unani, Ayurveda, Homeopathy and Siddha.<sup>6</sup> Dengue infection has emerged as a serious threat against the population, the above study of traditional medicinal plants with potential anti dengue properties as discussed in the tribal inhabited areas by the traditional local healers need an urgent call to identify and validate the precious knowledge of these ethno-medicinal practices and Documentation of such information will go a long way in developing new drugs through further clinical researches.

**Table 2**  
**Indigenous Medicinal Plants with reported anti-dengue activity, according to family and Botanical name**

Plant Name (Family)	Local name	Uses
Anedragaphis paniculata (Acanthaceae)	Bhui Neem	Whole herb is boiled in water and when half water remains the decoction is taken internally - acts as preventive to Dengue, Malaria as well as Chikungunya <sup>15</sup>
Alternanthera sessilis (Amaranthaceae)	Garandi Shak	One cupful decoction of whole plant twice A day for three days cure Malaria, dengue fever
Achyranthus aspera (Amaranthaceae)	Chirchita	The roots are cut in small pieces and tied around the wrist, this simple measure prevents the temperature rise to great extent in Chikungunya dengue attack
Chloroxylon swietenia (Rutaceae)	Bhirra	. The fumes coming out from these leaves are considered beneficial for general health and acts as promising mosquito repellent.
Cliostanthus collinus (Phyllanthaceae)	Karra	Loaded with fruits -toxicity of these fruits could be utilized for this disease the treatment of water ditches that are suitable places for mosquito breeding through insecticides. Use of Karra fruits in powder form for this treatment. These fruits are more effective than the insecticides and less harmful to the environment <sup>15</sup>
Calotropis procera (Asclepiadaceae)	Aak	Leaf and bark in the decoction form taken orally
Solanum xanthocarpum (Solanaceae)	Bhatkatiya	Decoction against high rise fever in dengue and chikanguniya
Azidarachta indica (Meliaceae)	neem	An infusion or a decoction of the fresh leaves is a bitter vegetable tonic and alternative, especially in chronic malarial and dengue fever
Carica papaya (Caricaceae)	papaya	The decoction obtained from the leaves of this plant acts against the severity of the Dengue Fever
Holarrhena antidysenterica (Apocynaceae)	Kutaj	smear the bark paste on the soles acts as a mosquito repellent

Dengue infection has been re emerging as a serious threat against the very existence of the human kind especially across the tropic and subtropical belt. Anti dengue potential of the explorative Indigenous medicinal plants have emerged as an answer to the alternative

solution. The potential indigenous medicinal plants with their anti dengue medicinal value as enumerated and documented in the following Table being used by the traditional herbal healers (Vaidyas, ojhas, Guniyas or sirhas) needs to be clinically validated with their

medicinal properties. There is an urgent extensive need from across the global research academic groups, clinicians, and pharma-industry throughout, with taking the advantage of indigenous knowledge of Traditional healers

for effective conversion and realization of indigenous plants with potential anti dengue compounds in to an effective and less toxic dengue drugs.

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