



A contribution to the Ethnomedicinal plants of Gautam Buddha Wildlife Sanctuary, Bihar & Jharkhand

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Abstract

Gautam Buddha Wildlife Sanctuary (GBWLS) is situated in Gaya district of Bihar and Hazaribagh & Chatra districts of Jharkhand. Field tours were conducted from 2012 to 2015 to document raw information on ethnomedicinal plants of GBWLS. In the present study, 48 species with 35 remedies were recorded with the help of key informants in the study area. The most dominant families were Asteraceae and Leguminosae, followed by Asclepiadaceae, Combretaceae, Acanthaceae, Amaranthaceae, Apocynaceae, Euphorbiaceae, Pteridaceae, Scrophulariaceae and Sterculiaceae. The leaves were the most frequently used plant part. Herbs were major sources of remedy followed by tree, climbers and shrubs. Decoction were the most dominantly used as mode of remedy preparation, followed by crushed/paste, juice/extract, raw, both crushed/paste form & juice/extract, decoction & crushed/paste form, juice/extract & decoction and raw & decoction.

Keywords: GBWLS, ethnomedicinal plants, herbs, remedy preparation

Introduction

People uses wild plants in many types of different way to meet his basic needs such as food, shelter and clothing, this is the basic need of human. Plants are used as a medicine for treatment of internal and external diseases. Wild plants are source of income and employment to the rural areas. India harbors a number of medicinal plants because of mega-diversity. These medicinal plants were used in Ayurvedic medicines for thousands of years ago by people. The richness of India's biological resources and related indigenous knowledge is an asset that needs to be cherished, conserved and judiciously utilized. Ethnobotany deals with the study of how people of a particular culture and region make use of indigenous plants. It may be also defined as an anthropocentric approach to botany and is essentially

concerned with gathering information on plants and their use (Rao & Henry, 1997). Many living groups of people, having diversified ethnic history of rituals and performance, who are more or less isolated from modern world and are closely associated with their ambient vegetation is the emporia of ethno botanical research (Pal & Jain, 1998). Ethnobotanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting, and religious ceremonies. Ethnomedicinal survey is one of the reliable sources of drug discovery (Fabricant and Farnsworth, 2001). Medicinal plants are frequently used to ameliorate various ailments in developing countries and are also in great demand in the developed world because people believe "natural is better" (Lewis, 2003). New diseases are emerging and many pathogens have developed resistance to currently used drugs.

Gautam Buddha Wildlife Sanctuary (GBWLS) is rich in biodiversity consisting of about 499 taxa. The ethnobotany of the study area is well developed and may be due to the presence of diversity of species, protected area and primitive tribes *Birhor*, *Santal* and *Munda*. These diverse groups co-exist together forming heterogeneous societies and their livelihoods are interlinked with forest resources. The knowledge on medicinal plants usage is very often passed on from one generation to the next only verbally (Nadembega *et al.*, 2011) and most of this knowledge has not been documented (Sofowora, 1993 and Asase *et al.*, 2010). Birhor ('Bir' means Forest and 'Hor' means Man or the man of forest) a forest tribe basically nomadic, hunters and food collectors and their day to day needs completely depend upon the forest resources such as food, medicines, shelters and other household purposes. They used plant's roots, barks, leaves, flowers, fruits and seeds for their livelihood. Fragmented information on ethnomedicines of Gaya district (Goel *et al.*, 2006; Kumar & Yadav, 2004, 2007; Pratap *et al.*, 2007, 2009) has been reported. Moreover due to deforestation, environmental degradation, migrations of traditional medicinal healers to other jobs cause rapid erosion of this rich knowledge. A larger part of the indigenous knowledge is still lying with the ethnic groups of the study area and needs to be explored and documented. Although, flora of Bihar Analysis has been compiled by Singh *et*

al. (2001) but detailed information about their medicinal properties are lacking. Therefore, a survey was conducted to explore and document the ethnomedicinal plants used by the tribes living inside the sanctuary in addition to floristic wealth of the area. The objective of this study was to preserve the knowledge of tribes of this region through documentation and also find the newer treatment of diseases for Primary health care management.

Study area

Gautam Buddha Wildlife Sanctuary is situated in Gaya district of Bihar and Hazaribagh & Chatra districts of Jharkhand. It was notified as a Wildlife Sanctuary in 1976 and lies between 24°19'-24°31' N latitudes and 84° 59' E - 85°17' E longitudes. At present, it covers an area of 259.5 km² of which 138.33 km² in Bihar and remaining area of 121.14 km² in Jharkhand. National Highway 2 bisects the sanctuary into two unequal halves. Mohane and Guari rivers flow from south to north in the Sanctuary and supply water to the sanctuary. The forests of the Sanctuary fall under Northern tropical dry deciduous forest, which has been sub-classified into Dry peninsular Sal forest, Northern dry mixed deciduous forest, Dry deciduous scrub forest, Butea forest and Dry Bamboo brakes (Champion and Seth, 1968).

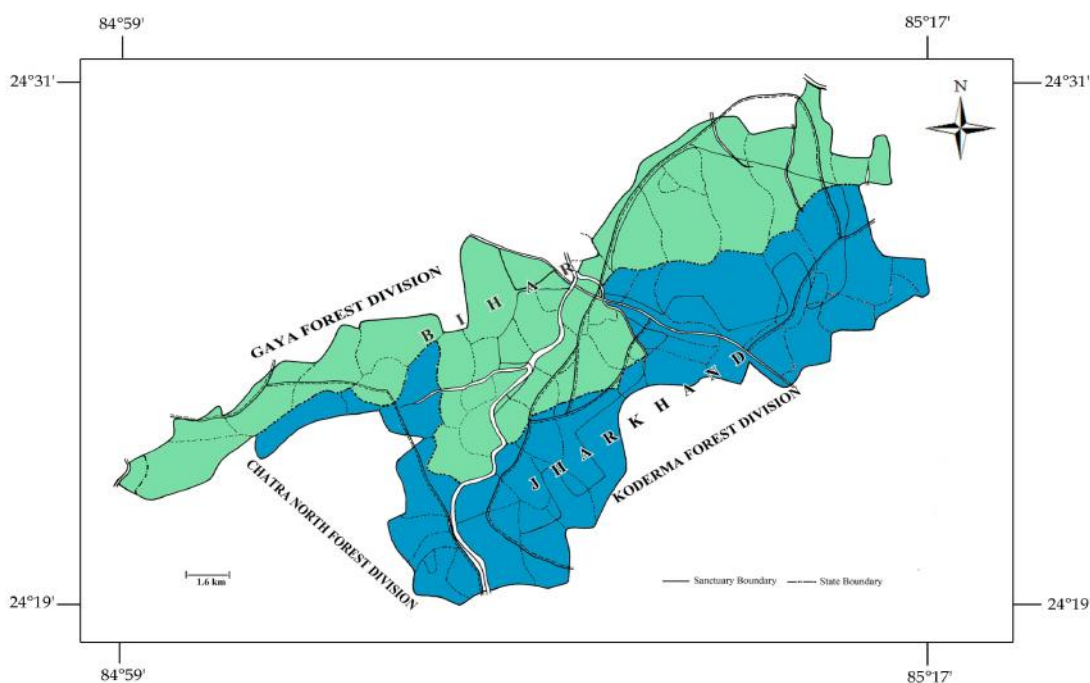


Fig. 1: Map of Gautam Buddha Wildlife Sanctuary, Bihar & Jharkhand

Materials and Methods

Field tours were carried out from 2012 to 2015 to document raw information on ethnomedicinal plants of GBWLS. A semi-structured interview was planned and printed questionnaires were prepared in the local language for the face-to-face interaction with informants. The printed questionnaires ensure same questions are presented to all informants (Martin, 1995) and vital information could be sourced during discussion. “Walk-in-the-wood” for *in situ* method of interviewing was adopted due to better quality of result and reliable data. Common names, ailments, methods of preparation and dosage of remedies used were documented during discussion. The plant

specimens were also collected for identification. The plant species were identified with the help of the relevant literature (Haines, 1921-25; Paria and Chattopadhyay, 2001 & 2005; Sarma and Sarkar, 2002) and matching with specimens housed at Central National Herbarium, Howrah (CAL). Herbarium specimens and plant parts collected during this study have been deposited at CAL for future references.

Results

In the present study, 48 species with 35 remedies were recorded with the help of key informants in the study area (Table 1).

Table 1: Ethnomedicinal plants of Gautam Buddha WLS, Bihar & Jharkhand

Sl. No.	Plants name/family name/local name/Ailments	Mode of preparation & administration
1.	<i>Acorus calamus</i> L.; Araceae; <i>Ghorbatch</i> ; Body pains	Powdered roots and leaves mixed with mustard oil and massaged over the affected parts.
2.	<i>Adiantum philippense</i> L.; Pteridaceae; <i>Garmai</i> ; Wounds	Powdered leaves is made into paste with water and used as ointment.
3.	<i>Ailanthus excels</i> Roxb.; Simaroubiaceae; <i>Ghorkarand</i> ; Piles, Stomach trouble	Decoction of leaves is given orally.
4.	<i>Aleuritopteris bicolor</i> (Roxb.) Fraser-Jenk.; Pteridaceae; <i>Karijhark/Pathalchat Ghas</i> ; Skin disease, Fever, Vomiting	Juice of fresh frond is used as ointment in skin disease. Decoction of whole plant/ roots is given in fever, vomiting.
5.	<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.; Amaranthaceae; <i>Sunita</i> ; Body pain	Powder of whole plant and of <i>Veronica anagallis-aquatica</i> L. is mixed with mustard oil and massaged over the affected parts.
6.	<i>Ammannia baccifera</i> L.; Amaranthaceae; <i>Karbenia</i> ; Leg & Thigh pain	Plant paste is rubbed externally on affected parts
7.	<i>Aristolochia indica</i> L.; Asclepiadaceae; <i>Isrod</i> ; i. Body pain, ii. Itching, Wound healing	i. Powder of whole plant is made into paste with water and used as ointment; ii. Roots and stems crushed with mustard oil and the paste is used as ointment.
8.	<i>Asparagus racemosus</i> Willd.; Asparagaceae; <i>Satur</i> ; For lactation	Decoction of roots is given.
9.	<i>Bauhinia purpurea</i> L.; Leguminosae; <i>Konar</i> ; Gas trouble	Powder of fruits is given along with tea or water.
10.	<i>Biophytum sensitivum</i> (L.) DC.; Oxalidaceae; Eye sore	The powder of leaves and flowers is made into paste and used as ointment.
11.	<i>Canscora diffusa</i> (Vahl) R. Br. ex Roem. & Schult.; Gentianaceae; <i>Kundri</i> ; Body pain	Powder of whole plant mixed with lukewarm mustard oil and is massaged over the affected parts.
12.	<i>Capparis sepiaria</i> L.; Capparaceae; <i>Kuhil</i> ; Weakness, Digestion	Decoction of roots and bark boiled in water is given orally.
13.	<i>Cassine glauca</i> (Rottb.) Kuntze; Celastraceae; <i>Khaura, Ratangarur</i> ; Limb swelling	Leaves and bark boiled in water, made into paste and used as ointment.
14.	<i>Cassytha filiformis</i> L.; Lauraceae; <i>Amarlata</i> ; Stomach cooling, Dysentery	The plant is soaked in water for whole night and the same is given orally in the morning.
15.	<i>Cocculus hirsutus</i> (L.) W. Theob.;	Decoction of leaves is given orally.

Sl. No.	Plants name/family name/local name/Ailments	Mode of preparation & administration
	Menispermaceae; <i>Chotlattan</i> ; Stomach pain	
16.	<i>Croton persimilis</i> Müll. Arg.; Euphorbiaceae; <i>Masaundha</i> ; Eye disease	Milky latex is used as eye drop.
17.	<i>Cryptolepis dubia</i> (Burm.f.) M.R. Almeida; Apocynaceae; <i>Dudhlar</i> ; Leg, Knee pain, Headache	Powder of dried leaves is made into paste by boiling with mustard oil and used as ointment; Roots and Stems are crushed, made into paste and rubbed externally for headache.
18.	<i>Curculigo orchioidea</i> Gaertn.; Hypoxidaceae; <i>Anakmul</i> ; Cough	Decoction of roots is given orally.
19.	<i>Cyathocline purpurea</i> (Buch.-Ham. ex D. Don) Kuntze; Asteraceae; <i>Jirhul Ghas</i> ; Infertility	Decoction of whole plant in milk or water is given orally.
20.	<i>Dicliptera paniculata</i> (Forssk.) I. Darbysh.; Acanthaceae; <i>Sukurmoni</i> ; Fever	Decoction of whole plant is given orally.
21.	<i>Elephantopus scaber</i> L.; Asteraceae; <i>Mijorgora</i> ; Stomach pain	Powder of roots mixed with 100 ml. milk, and 2½ black pepper is given orally.
22.	<i>Eranthemum purpurascens</i> Wight ex Nees; Acanthaceae; <i>Gujri</i> ; Wound healing	Powder of whole plant is made into paste with cold water and used as ointment for 1-2 days.
23.	<i>Sterculia urens</i> Roxb.; Sterculiaceae; <i>Galgol</i> ; Dysentery	The bark soaked in water is given orally.
24.	<i>Helicteres isora</i> L.; Sterculiaceae; <i>Aitha</i> ; i. Fever, ii. Analgesic	i. Fruits are boiled in water and decoction is given orally; ii. Infusion of fruits are prepared in mustard oil and used externally for massage.
25.	<i>Hemidesmus indicus</i> (L.) R.Br.; Asclepiadaceae; <i>Dudhlar/Kapurni</i> ; i. Heart beating, ii. for lactation, iii. Vomiting, Dysentery	i. Decoction of stems is given orally in blood pressure; ii. Leaves, flowers mixed with water is given orally; iii. Decoction of roots and leaves is given orally.
26.	<i>Holarrhena pubescens</i> Wall. ex G. Don; Apocynaceae; <i>Korra</i> ; i Diabetes, ii. Fever	i. Decoction of seed powder is given orally; ii. Decoction of bark is given orally.
27.	<i>Holoptelea integrifolia</i> (Roxb.) Planch.; Ulmaceae; <i>Chilbil</i> ; Etching	The crushed bark is made into paste and used as ointment.
28.	<i>Hymenodictyon orixense</i> (Roxb.) Mabb.; Rubiaceae; <i>Bhurkund</i> ; Droziness	Power of fruits is given orally with tea or water.
29.	<i>Jatropha nana</i> Dalzell & A. Gibson; Euphorbiaceae; <i>Ban-oal</i> ; Snake bite	Decoction of tuber is given
30.	<i>Leucas cephalotes</i> (Roth) Spreng.; Lamiaceae; Chicken pox	Decoction of whole plant mixed with leaves of <i>Abrus precatorius</i> , <i>Hemidesmus indicus</i> is given orally.
31.	<i>Ludwigia hyssopifolia</i> (G. Don) Exell; Onagraceae; <i>Petgaria</i> ; Stomach pain	Decoction of dried leaves is given orally.
32.	<i>Lygodium flexuosum</i> (L.) Sw.; Lygodiaceae; <i>Karijari</i> ; Fever	Decoction of leaves is given orally.
33.	<i>Mecardonia procumbens</i> (Mill.) Small; Scrophulariaceae; Body Pain	Powder of whole plant mixed with mustard oil, is massaged over the affected parts
34.	<i>Melilotus indicus</i> (L.) All.; Leguminosae; <i>Rasmi</i> ; Body Pain, fever	Powder of whole plant mixed with mustard oil, is massaged over the whole body.
35.	<i>Nyctanthes arbor-tristis</i> L.; Oleaceae; <i>Samsihar</i> ; Piles	Decoction of flowers is given orally.
36.	<i>Oroxylum indicum</i> (L.) Benth. ex Kurz; Bignoniaceae; <i>Dhalsor</i> , <i>Sanpat</i> ; i. Etching, Wounds, ii. Ear trouble	i. Seed oil is rubbed externally; ii. Powdered seeds are mixed in luke warm mustard oil and filtered is used as ear drop.
37.	<i>Parthenium hysterophorus</i> L.; Asteraceae; <i>Bangajra</i> ; Malaria	Decoction of leaves is given orally.

Sl. No.	Plants name/family name/local name/Ailments	Mode of preparation & administration
38.	<i>Pongamia pinnata</i> (L.) Pierre; Leguminosae; <i>Karanj</i> ; Skin disease	Seed oil is rubbed externally.
39.	<i>Selaginella bryopteris</i> (L.) Baker; Selaginellaceae; <i>Basanti</i> , <i>Jamainbuti</i> ; Fever, Flatulence	Decoction of plant is given orally.
40.	<i>Smilax zeylanica</i> L.; Liliaceae; <i>Raitan</i> ; Oral health	Stems are used as tooth brush.
41.	<i>Streblus asper</i> Lour.; Moraceae; <i>Sihora</i> ; i. Pyorrhea, ii. Vomiting, Dysentery	i. Stems are used raw; ii. Decoction of fresh leaves is given orally.
42.	<i>Telosma cordata</i> (Burm.f.) Merr.; Asclepiadaceae; <i>Apun</i> ; Waist and Knee pain	The powdered leaves and flowers made into paste and used as ointment.
43.	<i>Tephrosia purpurea</i> (L.) Pers.; Leguminosae; <i>Sarfora</i> ; Bubbles	Decoction of leaves is given orally.
44.	<i>Terminalia chebula</i> Retz.; Combretaceae; <i>Harra</i> ; Cough	The decoction of the powdered fruits is given in the morning.
45.	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.; Combretaceae; <i>Arjun/Kahua</i> ; Gas trouble	Powdered fruits are given orally with tea; Decoction of bark along with fruits of <i>Amala</i> (<i>Phyllanthus emblica</i>), <i>Bahera</i> (<i>Terminalia bellirica</i>), <i>Harre</i> (<i>Terminalia chebula</i>), <i>Kusum</i> (<i>Schleichera oleosa</i>) and bark of <i>Jamun</i> (<i>Syzygium cumini</i>), <i>Mahua</i> (<i>Madhuca longifolia</i>) and <i>Semal</i> (<i>Bombax ceiba</i>) is given orally.
46.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.; Combretaceae; <i>Bahera</i> ; Gas trouble	Powdered fruits are given orally with tea or water.
47.	<i>Tridax procumbens</i> L.; Asteraceae; Bleeding, Snakebite	Juice of leaves is applied to cure bleeding and snake bite
48.	<i>Veronica anagallis-aquatica</i> L.; Scrophulariaceae; <i>Rinki</i> ; Body pains	Powder of whole plant mixed with mustard oil, is massaged over the affected parts

Discussion

Observations

The reported species were represented by 31 families. The most important families in terms of number of taxa were Asteraceae & Leguminosae (4 species), Asclepiadaceae & Combretaceae (3 species each), Acanthaceae, Amaranthaceae, Apocynaceae, Euphorbiaceae, Pteridaceae, Scrophulariaceae and Sterculiaceae (2 species each). The remaining is represented by one species each. Amongst the 35 species studied, the leaves were the most frequently used plant part.

Remedy preparation and dosage

Herbs were major sources of remedy in terms of number of species (22 species) followed by tree (13 species), climbers (9 species) and shrubs (4 species) (Fig. 2). Of the reported 48 species, 25 species (52%) were used in the form of decoction, 16 species (34%) in crushed/paste form, 2 species (4%) in form of juice/extract, 1 species (2%) in form of raw and 1 species each (2%) in crushed/paste form & juice/extract, decoction & crushed/paste form, juice/extract & decoction and raw & decoction (Fig. 3).

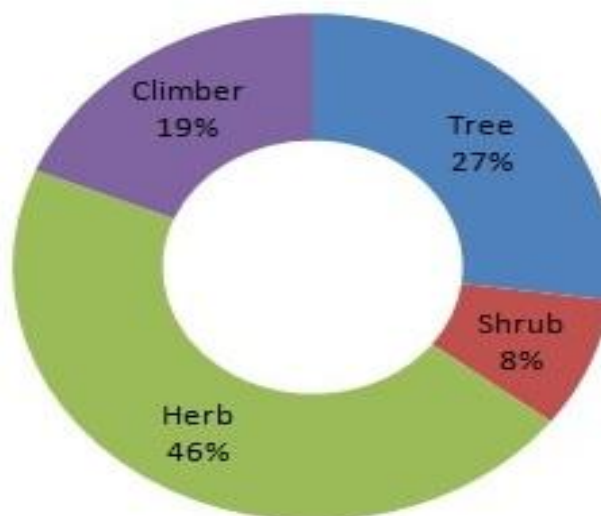


Fig. 2: Life forms

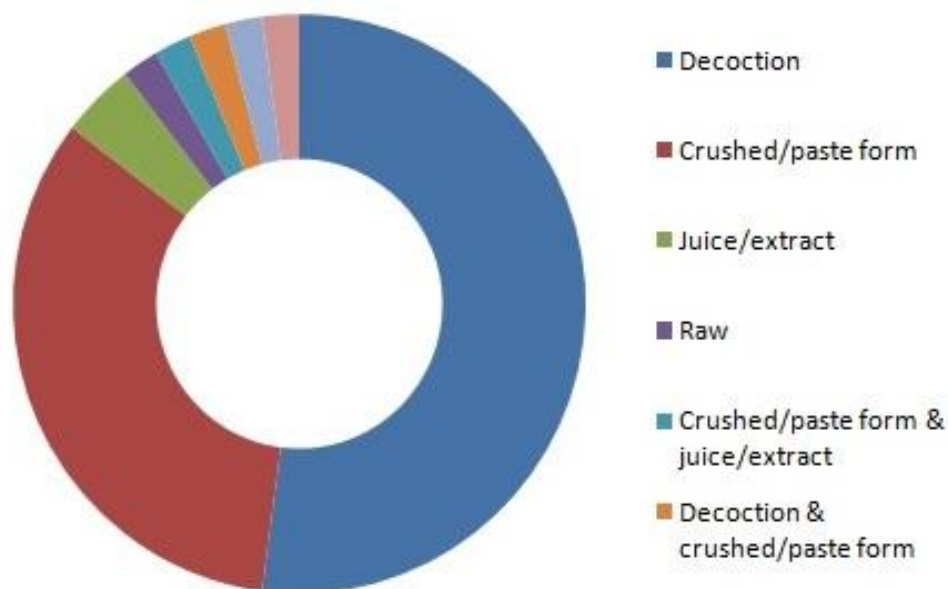


Fig. 3: Mode of remedy preparation

The administration routes are oral (56.4%), external (39.6%), and oral & external (4%). The dosages and duration of medicines varies from informants to informants and also according to severity of ailments and age of patient.

Ailments treated

The common ailments in the study area are body pain, cough and fever. The uses of medicinal plants are on the decline because selected modern drugs are available in rural areas, which provide quick relief. But in the remote areas local people prefer to treat ailments using medicinal plants.

Conclusion

A close interaction between medicinal plants and indigenous people has been found in the Sanctuary. In the present study, 35 remedies from 48 wild medicinal plant species used by tribes of the sanctuary have been documented. The information gathered from key informants reveals that plants are still a major source of medicine for the local communities of the Sanctuary, as modern health care facilities are still not available. However, due to the advent of modern medicines, changes in lifestyle, rapid industrialization of the planet and the loss of ethnic cultures and customs, the information on the use of medicinal plants will no doubt disappear. So, it is urgent need that the medicated claims incorporated in the study need to be evaluated through phytochemical and pharmacological investigations to discover their potentiality as drugs.

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References

- Asase, A., Akwetey, G.A. and Achel, D.G. 2010. Ethnopharmacological use of herbal remedies for the treatment of malaria in the Dangme West District of Ghana. *J. Ethnopharmacol.* 129: 367–376.
- Champion, H.G. and Seth, S.K. 1968. *A revised forest types of India*. Govt. of India Publications, New Delhi.
- Fabricant, D.S. and Farnsworth, N.R. 2001. The value of plants used in traditional medicine for drug discovery. *Environm. Health Perspect. (Suppl.)* 109: 69–75.
- Goel, R., Goel, R.K., Prasad, B.K., Kumar, A. and Yadav, D.K. 2006. Herbal treatment of diseases by village people in the Magadh region, (Bihar), India. In: Prajapati, N.D., Prajapati, T. and Jajpura, S. (eds.), *Advances in Medicinal Plants, Vol. II*. Asian Medicinal Plants, Jodhpur, India
- Haines, H.H. (1921–1925). *The Botany of Bihar and Orissa*. Adlard & Son Co. Ltd., London.
- Kumar, A. and Yadav, D.K. 2004. Significance of sacred plants in Shraddh Ritual (Pindadan) in Gaya, Bihar. *Ethnobotany* 16: 1–2.
- Kumar, A. and Yadav, D.K. 2007. Important Ethnomedicinal plants of family Poaceae in Gaya district, Bihar. In: Singh, V. (ed.), *Indian Folk Medicines and Other Plant-based Products*. Scientific Publishers, Jodhpur
- Lewis, W.H. 2003. Pharmaceutical discoveries based on Ethnomedicinal Plants: 1985 to 2000 and beyond. *Econ. Bot.* 57: 126–134.
- Martin, G.J. 1995. *Ethnobotany: A methods manual*. Springer US.
- Nadembega, P., Boussim, J. I., Nikiema, J.P., Poli, F. and Antognoni, F. 2011. Medicinal plants in Baskoure, Kourittenga Province, Burkina Faso: an ethnobotanical study. *J. Ethnopharmacol.* 133: 378–395.
- Pal, D.C. and Jain, S.K. 1998. Tribal Medicine. Naya Prokash, Calcutta.
- Paria, N.D. and Chattopadhyay, S.P. 2000 & 2001. *Flora of Hazaribagh District, Jharkhand*. Vol. I & II. Botanical Survey of India, Kolkata.
- Pratap, A., Kumar, A. and Yadav, D.K. 2009. Some unrecorded psychoactive plants and their less-known ethno medicinal uses in Gaya district, Bihar. *J. Econ. Taxon. Bot.* 33(2): 313–317.
- Pratap, A., Kumar, A. and Yadav, D.K. 2007. Herbal remedies for dental care system in Gaya district, Bihar. In: Singh, V. (ed.), *Indian Folk Medicines and Other Plant-based Products*. Scientific Publishers, Jodhpur
- Rao, N.R. and Henry, N.A. 1997. The ethnobotany of Eastern Ghats in Andhra Pradesh, India. *New Zealand Ethnobotany* 8: 8.
- Sarma, T.K. and Sarkar, A.K. 2002. In: Singh, N.P. and Rao, P.S.N. (eds.), *Flora of Palamau District, Jharkhand*. Botanical Survey of India, Kolkata.

- Singh, N.P., Mudgal, V., Khanna, K.K., Srivastava, S.C., Sahoo, A.K., Bandyopadhyay, S., Aziz, N., Das, M., Bhattacharya, R.P. and Hajra, P.K. 2001. *Flora of Bihar - Analysis*. Botanical Survey of India, Kolkata.
- Sofowora, A. 1993. *Medicinal Plants and Traditional Medicine in Africa*, 2nd edition Spectrum Book Ltd, Ibadan, Nigeria.

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