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Ethnomedicinal uses of potential medicinal plants in Kuldiha wildlife sanctuary of Odisha, India

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Abstract

Kuldiha wild life sanctuary in the Balasore district of the state of Odisha in India has rich biodiversity including medicinal plants. This area is inhabited by large population of various tribals such as Bathudi, Bhumij, Ho, Kolha, Munda, Santal, Shabar. People of these ethnic groups have rich indigenous knowledge about the medicinal plants, which are used for the treatments of various ailments. Ethnomedicinal studies conducted in different locations of Kuldiha wild life Sanctuary and its adjoining regions during the years 2018-2023 reveals much useful data regarding the traditional knowledge about the use of various medicinal plants by different tribal groups for the treatment of various diseases.

Keywords: Ethnomedicinal studies, Kuldiha Wildlife Sanctuary

Introduction

The state of Odisha in India has rich biodiversity because of much variation in topography and climatic conditions. Kuldiha wild life sanctuary in the Balasore district of the state of Odisha has rich biodiversity including medicinal plants. The sanctuary spread across 272.75 km² area. It is famous for the Mayurbhanj elephant reserve that spreads across Similipal, Kuldiha and Hadgarh wildlife reserve. The sanctuary has been declared an ecological sensitive zone on August 2, 2013 by the Government of India. It is a mixed deciduous forest dominated by the Sal trees and various types of medicinal plants.

The forests of Kuldiha wild life sanctuary possess the characteristics of tropical deciduous forest ^[1]. The Sanctuary is mainly covered by the plant species *Shorea robusta* followed by others including *Dalbergia latifolia*, *Gardenia latifolia*, *Kydia calicina* etc. It also provide shelter to the wide varieties of birds and animals including tigers, elephants, giant squirrels, horn bill, hill myna, peafowl etc.

This area is inhabited by large population of various tribal such as Bathudi, Bhumij, Ho, Kolha, Munda, Santal, Shabar. From time immemorial, people of these ethnic groups have been utilizing various plants and plant products for the treatment of different diseases. The impact of biotic factors such as urbanization, industrialization which have caused the loss of forests have resulted in the loss of biodiversity as well as the indigenous knowledge in different regions of Odisha ^[2-10].

Phytochemical analysis of ethnomedicinal plants as well as their antimicrobial activities provide much relevant information for the authentication of the medicinal properties of these plants ^[11-14].

Materials and Methods

Study area: The present investigation involves ethnomedicinal study in different locations of Kuldiha wild life Sanctuary and its adjoining regions. Kuldiha wild life Sanctuary is situated between 21°20'31" to 21°29'08" N latitude and 86°25'23" to 86°44'56" E longitude in the southern part of Balasore district of the state of Odisha in India (Fig.1). This region is linked with the Chotnagpur plateau and Similipal biosphere reserve through Sakhuapada and Natohill ranges. The maximum temperature of this region in the warmest month is 42 °C and the minimum temperature in the coldest month is 6 °C (Rout *et al.* 2018) ^[9]. It is considered as the tropical moist deciduous forest possessing average rainfall of 1568mm. Major prominent hills surrounding the region includes Asta pahar, Davgiri pahar, South Ranga Matia, Kolia parbat having the extension of 423 m, 682 m, 629 m, 495 m respectively. Rock of the Sanctuary includes khondolite, pyrogenic granites, charnokite, pyrogenic granites. There are two reservoirs in Kuldiha.

The Rissia reservoir in northwest is over river Tangana and Sindhua reservoir in southeast is over Uastal nala.

These two reservoirs have helped the crop and climate regime of the region.

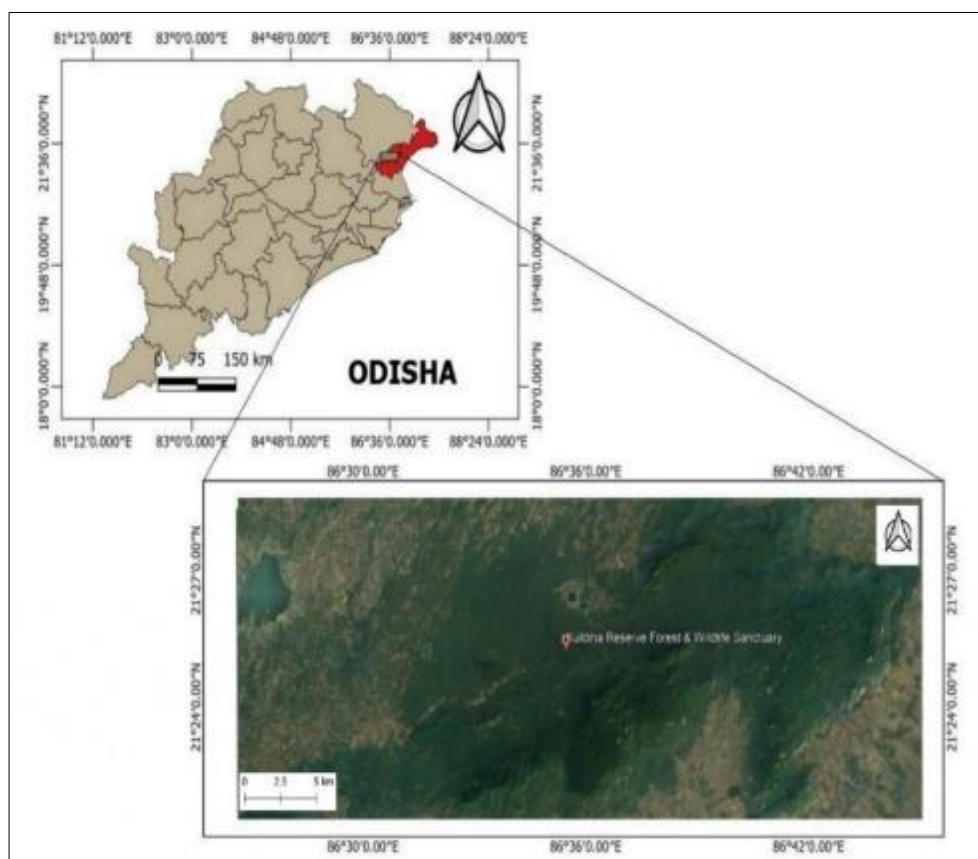


Fig 1: Map of Kuldiha wild life sanctuary

Plant collection and preservation

Regular field trips have been conducted in different seasons of the year during 2018-2023 to various locations of the Kuldiha wildlife sanctuary to know the distribution pattern and natural habitat of medicinal plants. The plant species collected have been identified with the help of regional flora books [15-16]. Herbarium samples have been collected from different locations of the study areas and the herbarium specimens have been prepared for future reference following standard methods [17].

Method of data collection

The ethnomedicinal data have been collected from the local ethnic groups and Vaidyas. The local elderly people with specialised knowledge on the medicinal plants have been consulted during the field survey. A number of group discussions have been done among the local people during the period of investigations. The data have been collected through interviews and personal interaction. As far as possible, the

data have been verified by criss-cross checking method to confirm the authenticity of the information regarding the ethnomedicinal uses of medicinal plants.

Results and Discussion

Ethnomedicinal surveys conducted in different regions of Kuldiha wildlife sanctuary during the years 2018-2023 to assess the medicinal uses of plants to meet the primary health care of needs of the local or tribal people. The herbarium specimens have been prepared following standard methods. The impacts of various biotic factors which are responsible for habitat destruction have been assessed and the present statuses of different medicinal plants have been evaluated.

It has also been observed that some plants are found to be very effective for the treatment of various diseases in Kuldiha Wild life sanctuary and its adjoining regions (Behera and Nayak, 2024) [14]. The Ethnomedicinal uses of potential medicinal plants by the Santal tribe in Kuldiha Wildlife Sanctuary has been recorded in the Table-1.

Table 1: Ethnomedicinal uses of potential medicinal plants by the Santal tribe in Kuldiha Wildlife Sanctuary

Sl. No.	Botanical name	Local name	Family	Plant parts used	Mode of application
1.	<i>Azadirachta indica</i> A Juss.	Nimba	Meliaceae	Bark	Bath taken in bark decoction for three to four times cures scabies.
2.	<i>Aegle marmelos</i> L.	Bela	Rutaceae	Fruit	Young fruit powder mixed with sugar candy is given to children for the treatment of blood dysentery.
3.	<i>Citrus medica</i> L.	Tabha	Rutaceae	Fruit	One cup of sugarcane juice mixed with 10 ml of fruit juice is given to pregnant women once in a day before meal to stop vomiting during pregnancy.
4.	<i>Dalbergia sissoo</i> Roxb.	Shisu	Fabaceae	Wood	Slices of wood boiled in an earthen pot and the dark brown extract obtained is used externally against ringworm and eczema.
5.	<i>Diospyros malabarica</i> (Desr.) Kostel	Mankada kendu	Ebenaceae	Fruit	Dry fruit is crushed, mixed with mother's milk or goat's milk and then given to cure diarrhea and dysentery in babies.

6.	<i>Ficus religiosa</i> L.	Aswatta, Hesakalah	Moraceae	Leaf	Warm leaf juice put into ear to cure ear infection and ear pain.
7.	<i>Mangifera indica</i> L.	Amba	Anacardiaceae	Seed	Seed powder mixed with onion juice tied in a clean cloth and given to inhale to stop bleeding from nose.
8.	<i>Tinospora cordifolia</i> (Thunb.) Miers	Guluchilata, Koilisuta	Menispermaceae	Stem	Freshly extracted stem juice is kept for some time to settle. The upper diluted part discarded and lower dense part is taken to treat burning sensation in palm and foot.
9.	<i>Withania somnifera</i> (L.) Dunal	Aswagandha(O)	Solanaceae	Leaf	The paste prepared from leaves is used for curing inflammation of tubercular glands. Root is used for curing skin diseases, bronchitis, and ulcer and eye diseases. An infusion of the bark is given for asthma. The leaves and root are also used in boosting immunity, reducing stress, depression level, memory enhancer, boosts thyroid function etc.
10.	<i>Zingiber officinale</i> Rosc.	Ada(O)	Zingiberaceae	Rizome	Fresh rhizome is chewed for the treatment of colds.

It has been observed that some potential medicinal plants reported from different locations of Kuldiha wildlife sanctuary contains various bioactive compounds which have

been reported by earlier workers from different regions of India which are responsible for the medicinal properties of these plants (Table 2).

Table 2: Ethnomedicinal uses and Bioactive compounds of potential medicinal plants in Kuldiha Wildlife Sanctuary

SL. No.	Botanical Name	Family	Local name	Plant parts used	Bioactive compounds	References
1.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neemba	Bark, leaf	Azadirachtin	Sarkar <i>et al.</i> , 2021 ^[18]
2.	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guill. & Perr.	Combretaceae	Dhaura	Bark, leaf, root	Flavonoids, phenols, cardiac glycosides	Singhal <i>et al.</i> , 2022 ^[19]
3.	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Belo	Leaf, fruit	Aegeline, Marmeline	Pathirana <i>et al.</i> , 2020 ^[20]
4.	<i>Cinnamomum zeylanicum</i> Breyn.	Lauraceae	Dalchini	Leaf	Cinnamic acid, Cinnamaldehyde, camphor	Sharifi-Rad, <i>et al.</i> , 2021 ^[21]
5.	<i>Capsicum annum</i> L.	Solanaceae	Lanka maricha	Fruit	Flavonoids, Phenolic acids, Capsaicinoids, Capsinoids, carotenoids	Hamed <i>et al.</i> , 2019 ^[22]
6.	<i>Citrus aurantifolia</i> (Chris.) Sw.	Rutaceae	Kagaji Lembu	Fruit	Rutin, neohesperidin, hesperidin, hesperitin	Saini <i>et al.</i> 2022 ^[23]
7.	<i>Curcuma longa</i> L.	Zingiberaceae	Haladi	Rhizome	Curcumin	Fuloria <i>et al.</i> , 2022 ^[24]
8.	<i>Diospyros embryopteris</i> Pers.	Ebenaceae	Mankada Kendu	Fruit, Bark	Triterpenoids, Tannin	Zreen <i>et al.</i> , 2022 ^[25]
9.	<i>Dalbergia latifolia</i> Roxb.	Fabaceae	Sisoo	Bark	Alkaloids, carbohydrates, glycosides, tannin.	Deshmukh <i>et al.</i> , 2021 ^[26]
10.	<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	Anla	Fruit	Ascorbic acid	Majeed <i>et al.</i> , 2008 ^[27]
11.	<i>Ficus religiosa</i> L.	Moraceae	Aswastha	Leaf, Bark, Root	Phenol, alkaloids	Murugesu <i>et al.</i> , 2021 ^[28]
12.	<i>Mangifera indica</i> L.	Anacardiaceae	Amba	Fruit	Mangiferin, gallic acid, catechins, quercetin, kaempferol,	Ediriweera <i>et al.</i> , 2017 ^[29]
13.	<i>Madhuca longifolia</i> (Koenig) Macbr.	Sapotaceae	Mahula	Flower, Fruit	Glycosides, flavonoids, terpenes and saponins	Devi and Sangeetha 2016 ^[30]
14.	<i>Ocimum sanctum</i> L.	Lamiaceae	Tulasi	Leaf	Eugenol, Saponin	Prakash and Gupta 2009 ^[31]
15.	<i>Tinospora cordifolia</i> (Willd.) Hook. f. & Thoms.	Menispermaceae	Giloy	Stem, Root, Leaf	Sesquiterpenoid, Glycosides, phenolics	Pradhan <i>et al.</i> , 2013 ^[32]
16.	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Ashwagandha	Leaf, Root	Somniferine, withanolides	Sukumar <i>et al.</i> , 2020 ^[33]
17.	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Ada	Rhizome	Zingiberene	Mahboubi, 2019 ^[34]

Conclusion

The present study showed that traditional treatment systems of using medicinal plants is still prevalent in different areas of Kuldiha wild life sanctuary. Documentation of this rich traditional knowledge regarding the ethnomedicinal uses of potential medicinal plants in proper form will be much useful for their application for the treatment of various diseases. Further study on the phytochemical analysis and antimicrobial activity of these plants will provide much information for their applications in herbal drug industries.

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