

Research Article

SOME POTENTIAL MEDICINAL PLANTS USED BY THE TRIBALS OF ANGUL DISTRICT, ODISHA, INDIA

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ABSTRACT: The present paper deals with the traditional uses of 20 medicinal plant species by some ethnic populace of the Angul district of Odisha. This ethnomedicinal study shows that the leaf, root, and fruit are the top three plant parts used. *Vanda tessellata* (Roxb.) Lodd. ex G. Don was the only epiphytic species and quite an important medicinal plant on the list. The plants possess a good range of medicinal properties to cure several ailments such as stomach, kidney, liver, cardiac, rheumatism, bone fracture, asthma, and skin problems, used as antidote, appetizer, and also effective for other diseases like fertility, general illness, fever, swellings, throat pain, etc. Large-scale commercial cultivation of these potential medicinal plants in a sustainable way is the urgent need of the hour with direct participation of the local tribal people and equal sharing of benefits and proper credit to them.

Key words: Angul, Cultivation, Equal sharing, Medicinal Plants, Sustainable, Tribal.

INTRODUCTION

Ethnomedicinal use of plants is a very old practice of human civilization and validation of such practices can lead to the effective and widespread use of the plant medicines (Pattanayak 2021, Pradhan *et al.* 2021, Patel *et al.* 2022). So, proper documentation of the medicinal plants used by different communities is important. Angul district is one of the centrally located districts of the state of Odisha, which was historically known as the land of Tribal'. It is situated between 20°37' N to 21°10' N latitude and 84°53' E to 85°28' E longitude in the Indian sub-continent. The northern as well as southern parts of the district are hilly while the rest of the area is having fertile valleys. Most of the hill slopes of the district are covered with forests and scrub vegetation. The soil varies from rich loams to grave detritus in the hilly slopes. The district enjoys a tropical climate with three distinct seasons *viz.*, summer, rainy and winter seasons.

Most of the area of the district is covered with dense forest which is of tropical dry deciduous type.

The forest always provides ecosystem services and plays an important role in the economic upliftment of any area. The total geographical area of Angul district is 6375 km², out of which the total forest cover constitutes 2783.38 km², *i.e.* 43.66% of the total geographical area of the district, in which 370.53 km² constitutes very dense forest, 1381.34 km² as moderate dense forest and 1031.51 km² as open forest (ISFR 2021). The total population of the district is 12,73,821; of these, the scheduled caste and Schedule tribe constitutes 18.81% (*i.e.* 239,552) and 14.10% (*i.e.* 179,603) respectively (Census 2011). The various ethnic groups inhabiting this district have been utilizing various plants, plant parts, and plant products for medicinal and other purpose (Fig. 1). Realizing the floristic richness, diversity, and meager works done earlier and to get substantial information about the ethnomedicinal and other uses of the plants, floristic surveys have been conducted in various areas of the districts during the recent time.

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METHODOLOGY

Regular field tours have been conducted to different areas of the district, keeping in view the distributional pattern along with the flowering and fruiting time of various plants. The plant samples have been collected and identified in consultation with the national and regional flora (Haines 1921-25, Saxena and Brahmam 1994-96). Information about medicinal and other uses of plants has been collected from the ethnic populace through regular interaction with them. The authenticity of the medicinal importance of the species found in different works of literature has also been confirmed, where ever possible by following standard literature of earlier days of the last century (Kirtikar and Basu 1935, Chopra *et al.* 1956, Saxena and Dutta 1975) and afterward (Agarwal and Ghosh 1985, Satyavati *et al.* 1987, Warriar *et al.* 1994-96).

As a case study, 235 angiospermic medicinal plant species have been collected and identified from various locations in the study area. Of these, only 20 selected medicinal plants have been given in the enumeration which is widely used by the tribal people. The species have been arranged alphabetically as per current nomenclature and family name has been given within parenthesis. Information regarding the medicinal uses of plants and the perception of local people regarding the use of plants was collected through a questionnaire following standard procedures. Later, the data were cross-checked among 212 individuals (Fig. 2) both males and females of different age groups (20-97 years old), with the local herbal healers, available literature, and a general conclusion was derived.

RESULTS AND DISCUSSION

Ethnomedicinal plants of odisha was studied by some researchers in the last century (Chandra 1998, Choudhury 1998). The systematic floristic studies in Angul districts have been started by Haines (1921-25). After that, Mooney (1950) has done a further investigation into the flora of this region. Later, Singh and Verma (1964) made some contributions to the forest botany of the Angul division. After a long gap, Patra and Choudhury (1992) made some contributions to the vegetation of Satkosia Wildlife Sanctuary located in Angul. These studies on flora have proved that Angul is quite rich in plant biodiversity.

Naturally, the tribal community of the study area is very much rich in ethnobotanical knowledge and uses several medicinal plants for treating various ailments in their day-to-day life but as a whole documentation of this immense ethnomedicinal knowledge is still due.

Some of the earlier works covering different aspects of ethnobotany include the work done by Singh (2012), who enumerated ethnomedicinal uses of 68 plant species from four districts of Odisha including Angul. Mahalik *et al.* (2014), reported some species used by the local tribes or rural native populace for the treatment of various diseases.

Our present study includes 20 ethnomedicinal plant taxa that have been widely used by the tribals of the study area for curing different diseases. Among 20 taxa, the highest species diversity in terms of number is 03 species recorded from the family Acanthaceae, followed by 02 species each of Asclepiadaceae, Fabaceae, and Rutaceae and 01 species each of Amaranthaceae, Apocynaceae, Caesalpiniaceae, Colchicaceae, Combretaceae, Lamiaceae, Liliaceae, Loganiaceae, Lythraceae, Orchidaceae, and Verbenaceae having ethnomedicinal uses (Table 1). The habit of maximum recorded medicinal plants was Tree (7 species), followed by Shrub (6 species), Herb (5 species), Climber (1 species), and Woody Vine (1 species) (Table 1). Leaf (9 species), root (6 species), and fruit (4 species) are the top three plant parts used, followed by bark, flower, seed (2 species each) and milky latex, rhizome, stem (1 species each) (Table 1 and Fig. 3). Highest 10 species were administered orally, followed by 08 species as applied locally and 02 species were used in both form *i.e.* oral and applied locally (Table 1 and Fig. 4). Some interesting findings to mention here are: *Vanda tessellata* was the only epiphytic species and quite rare, *Zanthoxylum asiaticum* as the single woody vine, *Asparagus racemosus* as a lone climber was recorded here to have ethnomedicinal value (Table 1). It is interesting to note that, in some cases, the same plant is also used for the treatment of different ailments. In many cases, the succulent plant parts or their juices are directly used as medicine. This point is not given proper importance during the validation of the medicinal value of the reported uses of the plants by the researchers of modern medicine, though plant parts contain the highest number and quantity of phytoconstituents in their succulent state (Pattanayak 2020).

The majority of People (both men and women) of age above 65 years old were having sound knowledge of medicinal plant uses, whereas the age group between 50-65 years was familiar with local medicinal plants; the age group 30-50 years were having partial knowledge of these ethnomedicinal plants and young age groups 20-30 years were found have poor command over ethnomedicinal plants uses, so documentation of

Some Potential Medicinal Plants used by the Tribals of Angul district, Odisha, India

these traditional practices is utmost requirement of time before they disappear in the mechanical era of present.

Documentation and preservation of immense traditional knowledge of tribals of Angul are keys for the treatment of many serious ailments and open new dimensions in the field of traditional medicine. Unjudicious exploitation of some species by local

tribes and medicinal plant collectors and exporters has created an alarming situation for the sustainable utilization of plant resources. It has been observed that the forest resources have been depleted at an alarming rate due to rapid industrialization and urbanization in the district. *In situ*, conservation of the existing forest vegetation is an urgent need of the hour.



Fig. 1. District map of Odisha showing the study area.

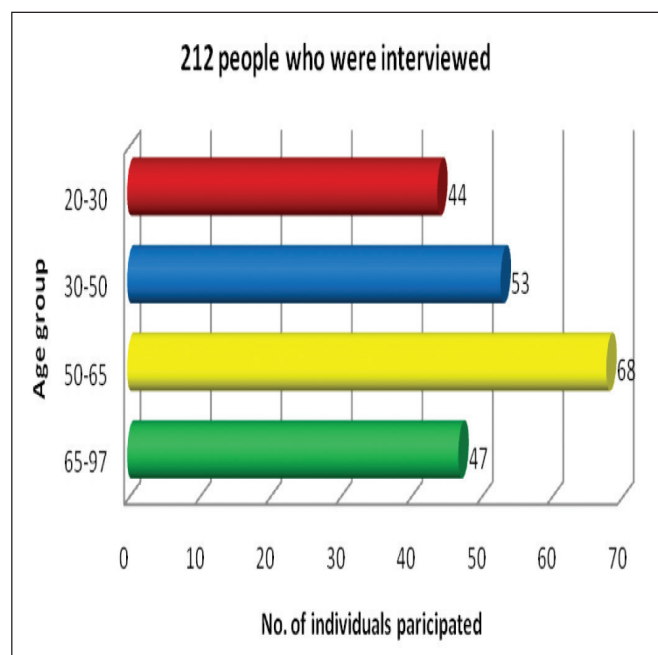


Fig. 2. Individuals of different age groups who were interviewed about use of medicinal plants.

Table 1. Medicinal plants used by some ethnic populace of Angul district in traditional therapy.

Scientific Name with Family	Habit	Local Name	Locality	Part(s) used	RA	Medicinal Use
<i>Aegle marmelos</i> (L.) Correa [Rutaceae]	T	Bela	Tikarpar	Leaf, fruit	O	The leaves are chewed regularly for about one month to cure stomach diseases. Young fruits are burnt and then eaten to check loose motion.
<i>Andrographis paniculata</i> (Burm.f.) [Acanthaceae] Wall. ex Nees	H	Bhuinlimba	Athmallik	Leaf, root	O	The leaves are grinded and dried to prepare tablets. These tablets are eaten in empty stomach to remove worms. The roots are used to cure fever.
<i>Asparagus racemosus</i> Willd. [Liliaceae]	C	Satabari	Athmallik	Root	O	Root of the plant and that of <i>Smilax zeylanica</i> L. crushed and the juice is administered to cure weakness of semen. The root of plant is also used as tonic, aphrodisiac and for diseases of the kidney and liver. It is also used as anti-diarrhoeatic and anti-dysenteric.

Scientific Name with Family	Habit	Local Name	Locality	Part(s) used	RA	Medicinal Use
<i>Butea monosperma</i> (Lam.) Taub. [Fabaceae]	T	Palasa	Tikarpara, Chendipada	Bark, flower	AL, O	The bark paste of the plant is used in bone fractures. The flower extract is used for contraception and flower juice is employed in case of cold and fever in children.
<i>Calotropis gigantea</i> (L.) W.T. Aiton [Asclepiadaceae]	S	Arakha	Athmallik	Root, milky latex	AL	Root of the plant is used externally for induction of abortion at early stage. It is also used as an antidote for snake bite. The milky latex is applied to check headache.
<i>Cassia fistula</i> L. [Caesalpiniaceae]	T	Sunari	Angul, Boinda	Root, fruit	AL, O	The roots are used in skin diseases and syphilis. The fruits are used in rheumatism, jaundice and cardiac disorders.
<i>Celosia argentea</i> L. [Amaranthaceae]	H	Lenuga	Tikarpara	Leaf, root	O	The leaf juice is given to cure headache. The root is powdered and is applied to cure boil in the mouth.
<i>Erythrina variegata</i> L. [Fabaceae]	T	Paladhua	Chendipada	Leaf	O	Decoction of the leaf along with honey is given to ladies during pregnancy to increase blood level.
<i>Gloriosa superba</i> L. [Colchicaceae]	H	Pancha Angulia	Talcher	Rhi-zome, stem	O, AL	The rhizome is useful in ulcers, leprosy, dyspepsia and parasitic skin diseases. It is also useful in stimulating labor pain and expulsion of the placenta. The stem of the plant is tied around the arm of women to clear up the obstacle during delivery.
<i>Hemidesmus indicus</i> (L.) R.Br. [Asciopiadaceae]	H	Anantmul	Mera-munduli, Rengali	Root	AL, O	The root of the plant is useful to cure leucoderma, leprosy, rheumatism and fever.
<i>Holarrhena pubescens</i> Wall. ex G. Don [Apocynaceae]	T	Pitakorwa	Tikarpara	Bark	O	The juice of the bark is mixed with <i>Piper nigrum</i> L. and applied to cure dysentery. The joint pain due to rheumatism is relieved by application of the paste prepared from the bark of the plant.
<i>Hygrophila auriculata</i> (Schumach.) Heine [Acanthaceae]	S	Koilikhia	Athmallik	Leaf	O	The leaf juice is a good blood purifier. It is taken in empty stomach for about two weeks to check anaemia and to increase appetite.
<i>Justicia adhatoda</i> L. [Acanthaceae]	S	Basanga	Athmallik	Leaf	O	The juice of the leaf is taken for the treatment of common cold and asthma. The leaf is also boiled in water and then used for bath to relieve cough.
<i>Lantana camara</i> L. var. <i>aculeata</i> (L.) Moldenke [Verbenaceae]	S	Naguari	Boinda	Leaf	O	The leaf is grinded and then applied to cure the wounds.
<i>Ocimum basilicum</i> L. [Lamiaceae]	S	Landa-baguli	Tikarpara	Seed	O, AL	The seeds are soaked in water and taken to cure stomach disorder. The soaked seeds are also applied over boils.

Some Potential Medicinal Plants used by the Tribals of Angul district, Odisha, India

Scientific Name with Family	Habit	Local Name	Locality	Part(s) used	RA	Medicinal Use
<i>Strychnos nuxvomica</i> L. [Loganiaceae]	T	Kochila	Athmallik	Seed	AL	The seeds are soaked in cow urine for nearly one week, then fried in cow ghee and then applied to eczema and other skin diseases to cure these ailments.
<i>Terminalia bellirica</i> (Gaertn.) Roxb. [Combretaceae]	T	Bahada	Boina	Fruit	O	Paste (5gm) prepared from the fruit of this plant is mixed with equal quantity of paste, prepared from the fruits of <i>Phyllanthus emblica</i> L. and is given with 50 ml cow's milk twice daily to diabetes patient, one hour before food to reduce the sugar level in body.
<i>Vanda tessellata</i> (Roxb.) Lodd. ex G. Don [Orchidaceae]	H (epiphytic)	Malanga	Tikarpara	Root, leaf	O, AL	Medicines extracted from the roots of the plant are used to cure rheumatism. The powder prepared from the dried leaves is applied in the wounds to check pus formation.
<i>Woodfordia fruticosa</i> Kurz. [Lythraceae]	S	Dhatki	Tikarpara	Root, flower	AL, O	The powder prepared from the dried root is applied in wounds and boils to get relief from them. The decoction of flowers (4-5 in number) with honey is taken in nausea.
<i>Zanthoxylum asiaticum</i> (L.) Appelhans, Groppo & J. Wen. [Rutaceae]	WV	Tundapura	Boinda	Leaf, fruit	AL, O	The leaf juice is applied to cure burning wounds and tongue infection. The leaf is also eaten to check indigestion. The ripened fruits are eaten to improve appetite.

[Abbreviations: H = Herb, S = Shrub, T = Tree, C = Climber, WV = Woody vine, RA = Route of Administration, O = Oral, AL = Applied locally].

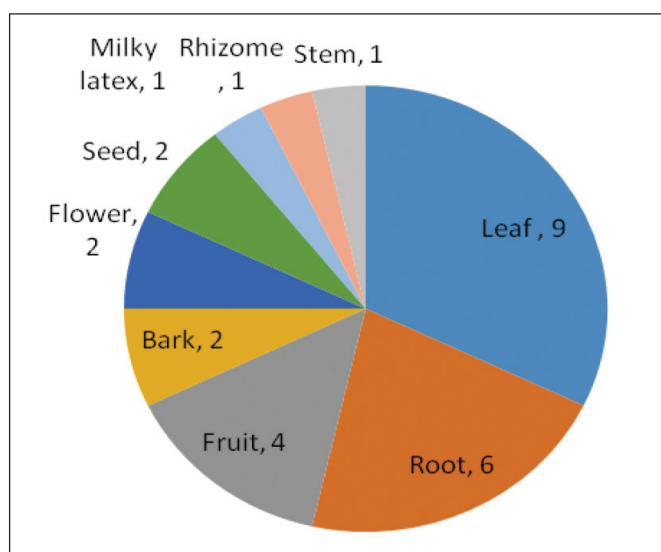


Fig. 3. Chart showing the plant parts used as ethnomedicine, followed by number of species.

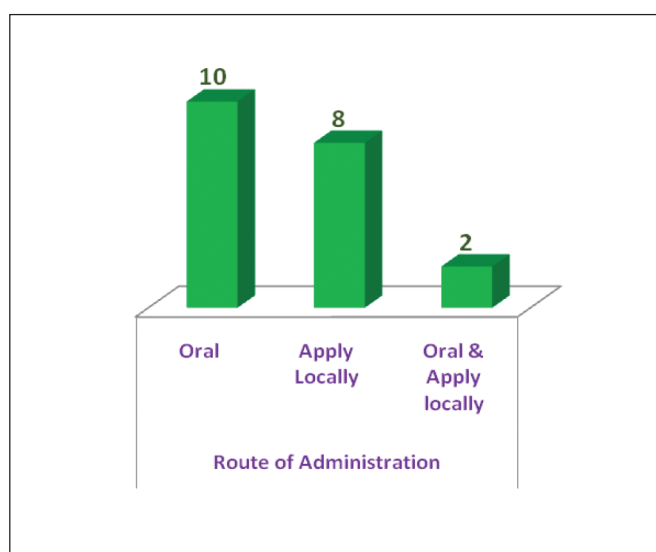


Fig. 4. Route of administration of plant parts, followed by number of species



Fig. 5. Some potential medicinal plants used by the Tribals of Angul district, Odisha, India.

(A) *Aegle marmelos* (B) *Andrographis paniculata* (C) *Asparagus racemosus* (D) *Butea monosperma* (E) *Calotropis gigantea* (F) *Cassia fistula* (G) *Celosia argentea* (H) *Gloriosa superba* (I) *Hemidesmus indicus* (J) *Holarrhena pubescens* (K) *Hygrophila auriculata* (L) *Justicia adhatoda* (M) *Ocimum basilicum* (N) *Strychnos nux-vomica* (O) *Terminalia bellirica* (P) *Vanda tessellata* (Q) *Woodfordia fruticosa* (R) *Zanthoxylum asiaticum* (L.) Appelhans, Groppo & J. Wen.

CONCLUSION

From the present study, it is evident that the Angul district in the state of Odisha in the Indian continent harbours plants having various ethnomedicinal importance. It is also observed that the tribal populace is directly or indirectly dependent on the native ethnomedicinal plant resources to meet their day-to-day needs for primary healthcare. From the conservation point of view, large-scale commercial cultivation of these potential medicinal plants in a sustainable way should be carried out by the Government as well as the voluntary agencies which are very much required with direct participation of the local tribal people and with equal sharing of benefits and proper credit to the informer groups. It will cater to the need of the present situation and uplift the local economy of tribal people and the district as a whole.

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