



Documentation of Indigenous Traditional Knowledge (ITK) on Commonly Available Plants in Koira Range, Bonai Forest Division, Sundargarh, Odisha, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Mining activities are an important source of revenue for the development of the nation. However, it creates lots of social and ecological imbalance. The major remarked problem is that the local communities of mining areas losses their Indigenous Traditional Practices. Keeping this in view, an attempt has been made to document the indigenous traditional knowledge on commonly available plants in Koira Range, a mining impacted areas of the Bonai Forest Division, Odisha, India. Twenty nine villages of 4 sections are selected for present survey works. The results revealed that about 63 plants are commonly used by the local communities for different purposes. The practices are documented through present study. The present work will provide a baseline data for conservation strategy and biological activities including value addition of available plant wealth.

Keywords: Sundargarh; conservation of traditional uses; Odisha; tribal community.

1. INTRODUCTION

COVID-19 created a point of attention towards the plants used as a traditional therapeutic agent

for primary health care. Globally the researchers, academicians, intellectuals, Govt. officials, Non-Government Organisation and local communities are trying to work on medicinal plants as per their

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objectives. From last many decades it was needed that we should work on medicinal plants due to global loss. The major reasons behind the global loss of medicinal plants are deforestation, over extraction, introduction of invasive species, anthropogenic activities, climate change etc. Among them, mining activities are essential for development of Nation, but also it creates several negative climatic factors, leads to loss of medicinal plants and their mode of uses. Therefore, urgent need to document, restore and conservation of medicinal plants in mining areas. Keeping this in view, and urgent need of documentation, an attempt has been taken to document the medicinal plants in Koira Range, Bonai Forest Division, Odisha and their traditional therapeutic system.

2. METHODOLOGY

2.1 Study Area

Bonai Forest Division is situated between coordinates of 21° 39' 8" N and 85° 30' 23" E towards the North-Western boundary of Sundargarh district of the state Odisha in Eastern India. The study area is situated between

coordinates of latitude 21.901723 and the longitude 85.246372 (Fig. 1). The Koira forests contain best quality of Sal in association with Asan (*Terminalia elliptica*), Kurum (*Haldina cordifolia*), Sidha (*Lagerstroemia parviflora*) etc. The temperature hovers around 40°C in summer and drop to 8°C -10°C in winter. Koira gets annual rainfall of about 1400 mm during rainy season. The study area is dominated with many tribal communities. Major communities in this area are Munda, Ho, Dehuri, Bhuian etc. [1, 2].

2.2 Data Collection

Field works was carried out throughout the year of 2021 on some common medicinal plants available in the study area. Ethno-botanical information was collected through semi-structured interviews [3]. Plants were identified with help of the Flora books [4,5] available literature. The information regarding the usefulness of these medicinal plants was gathered from the villagers as well as traditional healers, particularly the old people (40-60 years) from 29 villages of the study area by direct interview (Plates 2 & 3).

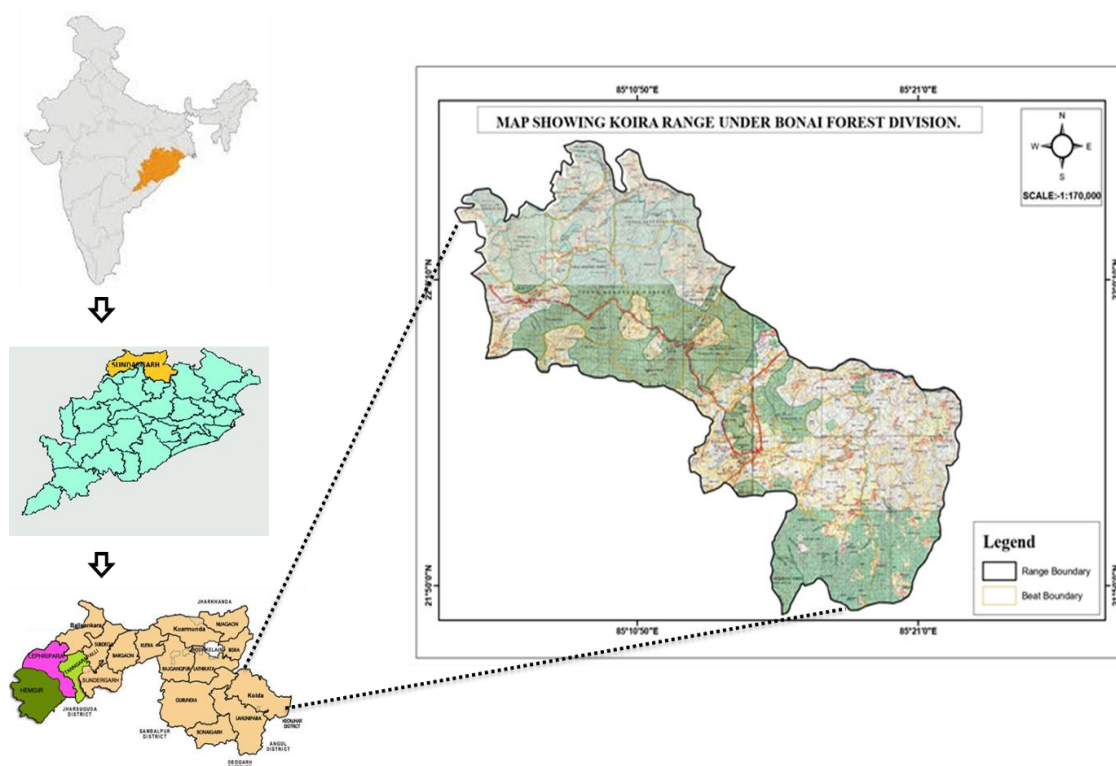
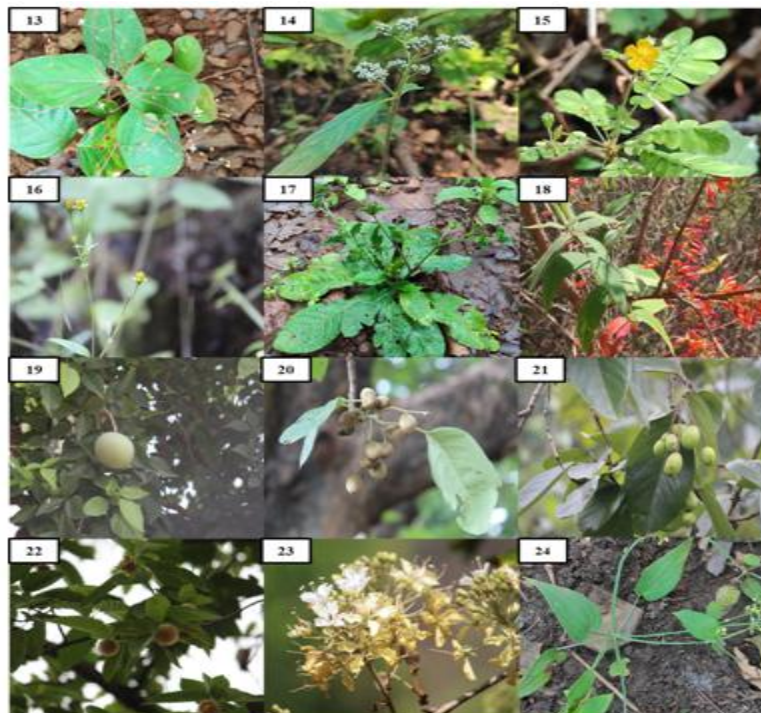


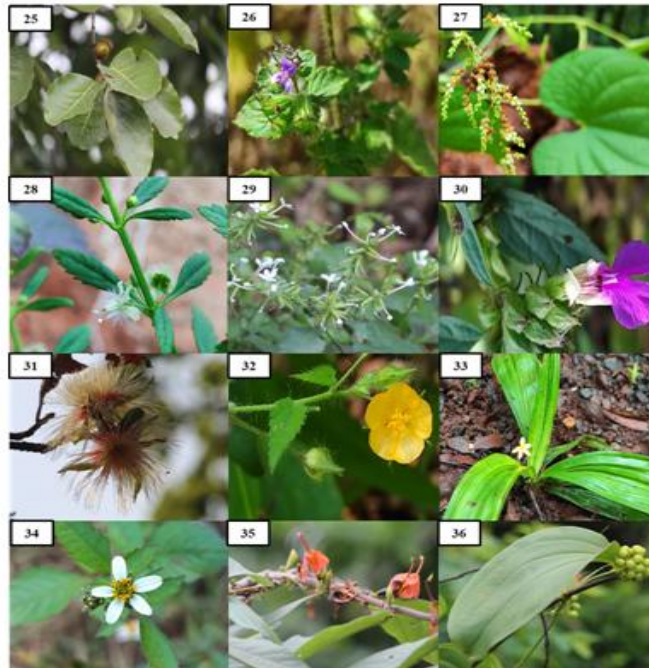
Fig. 1. Geographical location of study area



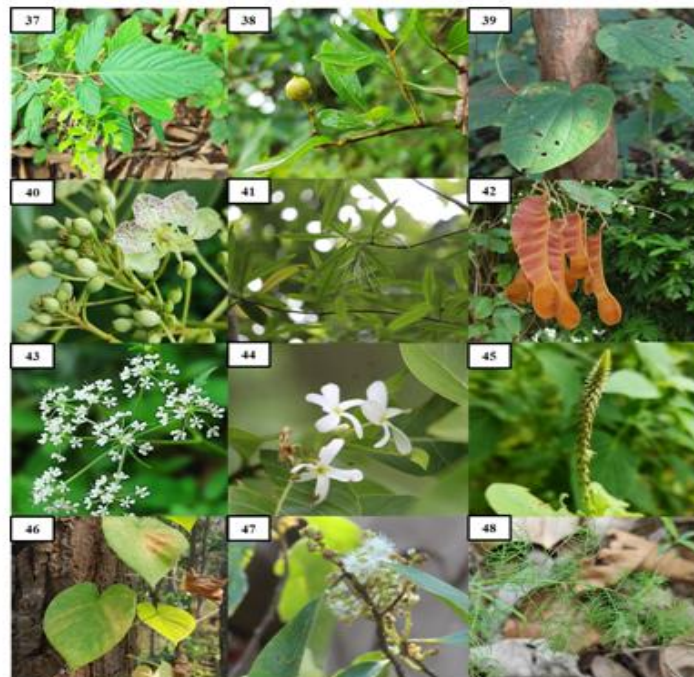
1) *Andrographis paniculata*, 2) *Hemidesmus indicus*, 3) *Ageratum conyzoides*, 4) *Desmodium triquetrum*, 5) *Celastrus paniculatus*, 6) *Millettia pinnata*, 7) *Evolvulus alsinoides*, 8) *Cissampelos pareira*, 9) *Cassia fistula*, 10) *Baccharoides anthelmintica*, 11) *Bauhinia malabarica*, 12) *Grona triflora*



13) *Hedyotis ovatifolia*, 14) *Knoxia sumatrensis*, 15) *Biophytum sensitivum*, 16) *Acmella paniculata*, 17) *Elephantopus scaber*, 18) *Woodfordia fruticosa*, 19) *Aegle marmelos*, 20) *Terminalia bellirica*, 21) *Terminalia chebula*, 22) *Haldina cordifolia*, 23) *Phanera vahlii*, 24) *Rubia cordifolia*



25) *Diospyros melanoxylon*, 26) *Mesosphaerum suaveolens*, 27) *Dioscorea bulbifera*, 28) *Scoparia dulcis*, 29) *Plumbago zeylanica*, 30) *Anisomeles indica*, 31) *Careya arborea*, 32) *Sida cordata*, 33) *Curculigo orchiodes*, 34) *Bidens pilosa*, 35) *Helicteres isora*, 36) *Smilax zeylanica*



37) *Phyllodium pulchellum*, 38) *Lawsonia inermis*, 39) *Dioscorea puber*, 40) *Phanera retusa*, 41) *Alstonia scholaris*, 42) *Butea superba*, 43) *Pimpinella heyneana*, 44) *Wrightia antidysenterica*, 45) *Achyranthes aspera*, 46) *Tinospora cordifolia*, 47) *Symplocos racemosa*, 48) *Asparagus racemosus*

Plate 1. Common plants used in different aspects in study areas



Plate 2. Collection of information on Indigenous Traditional Knowledge from different sections of Koira Range, Bonai Forest Division, Odisha, India

3. RESULTS

Conservation of Indigenous Traditional Knowledge (ITK) through documentation is need of hour throughout the world particularly, in mining areas and high anthropogenic impacted areas. The present result is outcomes of survey works in 29 villages of mining areas of Koira Range, Bonai Forest Division, Odisha, India. The results revealed that 63 commonly available plants species are recorded which is used under Indigenous Traditional Practices. It was observed that the maximum species belongs to Fabaceae family followed by Asteraceae, Dioscoreaceae, Rubiaceae etc. It was noted that some common

wild edible plants are consumed in traditional ways. The tubers of *Dioscorea bulbifera* are burnt and consumed as snacks whereas the tubers of *Dioscorea hispida* are kept overnight in running water and consumed as a vegetable (Fig. 2). *Antidesma ghaesembilla*, a very common leafy vegetable among the Munda tribe, locally known as Matha saga (Fig. 3). Likewise leaves of *Hibiscus sabdariffa* is used as leafy vegetable in Munda community and also they use the fruits to make a sweet & sour chutney (Fig. 4). The fully ripen fruits are also eaten raw or cooked. Details are described and listed in Table 1 and the colour photographs of enumerated species are provided (Plate 1).

Table 1. Indigenous Traditional Knowledge on commonly available plants in Koira Range, Bonai Forest Division, Odisha, India

Local name	Botanical name	Family	Part(s) used	Mode & use(s)	Collection site(s)
Agnibija	<i>Baccharoides anthelmintica</i>	Asteraceae	Seeds	The paste of seed powder is applied externally in paralysis of the legs.	Kalta, Toda Section, Koira Range
Akanabindhi	<i>Cissampelos pareira</i>	Menispermaceae	Rhizome	Infusion of rhizome is used to cure gastro-intestinal complaints.	Ranisal, Ranisal Section, Koira Range
Akarkara	<i>Acmella paniculata</i>	Asteraceae	Flowers	The crushed flowers are applied externally to cure toothache.	Kadalia, Ranisal Section, Koira Range
Anantamula	<i>Hemidesmus indicus</i>	Asclepiadaceae	Root	Root powder is used in fever.	Baldihi, Ranisal Section, Koira Range
Anla	<i>Phyllanthus emblica</i>	Phyllanthaceae	Fruits	Fruits are used in Trifala, potential against cough. Fruits are collected and sell in local market.	Toda, Toda Section, Koira Range
Apamarga	<i>Achyranthes aspera</i>	Amaranthaceae	Whole plant	The dried leaf powder is taken with honey to treat diarrhoea.	Khajurdihi, Ranisal Section, Koira Range
Atundi	<i>Combretum roxburghii</i>	Combretaceae	Root	Root paste is applied externally against syphilis till cure.	Jamudihi, Jamudihi Section, Koira Range
Bada chakunda	<i>Cassia hirsuta</i>	Fabaceae	Leaves	Leaf paste is used to cure skin infections.	Kusumdihi, Toda Section, Koira Range
Bahada	<i>Terminalia bellirica</i>	Combretaceae	Fruits	Bahada fruits are used in Trifala, potential against cough. Fruits are collected and sell in the local market.	Nadidihi, Toda Section, Koira Range
Bana piaja	<i>Drimia indica</i>	Asparagaceae	Bulb	Bulb is cooked as vegetable and consumed in cough & to improve the appetite.	Kunchpani, Jamudihi Section, Koira Range
Bana tulsi	<i>Mesosphaerum suaveolens</i>	Lamiaceae	Leaves	The fresh leaves are collected and make juice. 2 tea spoons are taken to cure whooping cough.	Jhirpani, Toda Section, Koira range
Bansibuta	<i>Pimpinella heyneana</i>	Apiaceae	Whole plant	Whole plant decoction is used in gastro intestinal tract disorder.	Kalta, Toda Section, Koira Range
Banya alu	<i>Dioscorea hispida</i>	Dioscoreaceae	Tubers	Tubers are edible. Tubers are kept in running water overnight then boil and boiled tubers are edible.	Jhirpani, Toda Section, Koira range
Bawngekhlo	<i>Grona triflora</i>	Fabaceae	Whole plant	Whole plant decoction is used in dysentery.	Jhirpani, Toda Section, Koira range
Bela	<i>Aegle marmelos</i>	Rutaceae	Fruits & Leaves	Leaf decoction helps in eliminating fever; fruit juice is used for cooling and also against stomach problems.	Swayamba, Jamudihi Section, Koira Range
Bharda	<i>Thalictrum foliolosum</i>	Ranunculaceae	Leaves	The juice of the leaves is applied to boils and pimples.	Panposia, Ranisal Section, Koira Range
Birkapi	<i>Phyllodium pulchellum</i>	Fabaceae	Bark	Bark decoction used in diarrhoea.	Panposia, Ranisal Section, Koira Range

Local name	Botanical name	Family	Part(s) used	Mode & use(s)	Collection site(s)
Bisiripi	<i>Sida cordata</i>	Malvaceae	Seeds	Paste of seed is used in piles	Segasahi, Koira Section, Koira range
Chatian	<i>Alstonia scholaris</i>	Apocynaceae	Bark	Bark paste is used in skin infections.	Nadidihi, Toda Section, Koira Range
Chini saga	<i>Scoparia dulcis</i>	Plantaginaceae	Leaf	Leaf paste is mixed with sugar and taken twice per day in empty stomach to cure diarrhoea.	Malda, Koira Section, Koira range
Chireita, Bhuin neem	<i>Andrographis paniculata</i>	Acanthaceae	Leaves	Decoction of leaves is taken 2 times in empty stomach in malaria and stomach pain; leaf paste is applied externally in skin infections.	Kunchpani, Jamudihi Section, Koira Range
Chitrak	<i>Plumbago zeylanica</i>	Plumbaginaceae	Root	Root paste mixed with mustard oil and applied externally to cure arthritis.	Puruna pani, Toda Section, Koira Range
Chota karijori	<i>Ludwigia perennis</i>	Onagraceae	Seed	Seed paste is used both internally and externally to cure cough.	Khajurdihi, Ranisal Section, Koira Range
Dhatiki	<i>Woodfordia fruticosa</i>	Lythraceae	Flowers	Flowers are used as a supplement in county liquor (Handia). The flowers are also consumed raw to reduce the sexual problems in male.	San roxy, Jamudihi Section, Koira Range
Gobara	<i>Anisomeles indica</i>	Lamiaceae	Whole plant	Plant paste is used in skin infections.	Khajurdihi, Ranisal Section, Koira Range
Guadhuni	<i>Millettia extensa</i>	Fabaceae	Bark	The juice of the bark is applied to treat scabies.	Malda, Koira Section, Koira range
Guduchi	<i>Tinospora cordifolia</i>	Menispermaceae	Stem	The juice extracted from the crushed stem is used to boost immunity.	Jhirpani, Toda Section, Koira range
Gundhri	<i>Bidens pilosa</i>	Asteraceae	Whole plant	Whole plant paste is used in wounds.	Kalta, Toda Section, Koira Range
Harida	<i>Terminalia chebula</i>	Combretaceae	Fruits	Harida fruits are used in Trifala, potential against cough. Fruits are collected and sell in market.	Segasahi, Koira Section, Koira range
Ipil	<i>Hibiscus sabdariffa</i>	Malvaceae	Fruits	Fruits are used to make chutney.	Kadadiha, Koira Section, Koira range
Jamun	<i>Syzygium cumini</i>	Myrtaceae	Fruits	Fruits are edible and used to treat diabetes. Fruits are collected and sell in market.	Swayamba, Jamudihi Section, Koira Range
Kandri	<i>Knoxia sumatrensis</i>	Rubiaceae	Arial parts	Paste of aril part is used in cuts and wounds	Jhirpani, Toda Section, Koira range
Karanja	<i>Millettia pinnata</i>	Fabaceae	Seeds	Seed oil is used in skin infections.	Jamudihi, Jamudihi Section, Koira Range
Kasi	<i>Bridelia retusa</i>	Phyllanthaceae	Fruits	Raw fruits are used in diabetes.	Belkudar, Koira Section, Koira range

Local name	Botanical name	Family	Part(s) used	Mode & use(s)	Collection site(s)
Kendu	<i>Diospyros melanoxylon</i>	Ebenaceae	Fruits & Bark	Fruits are edible. Decoction of bark is used in diarrhoea.	Toda, Toda Section, Koira Range
Koteli gumbati	<i>Bauhinia malabarica</i>	Fabaceae	Leaves	Leaf infusion is used to reduce fever.	Rengalbeda, Koira Section, Koira range
Kujuri	<i>Celastrus paniculatus</i>	Celastraceae	Seed	Seed oil is applied on joints for the treatment of rheumatic pain.	Kalta, Toda Section, Koira Range
Kukei sanga	<i>Dioscorea puber</i>	Dioscoreaceae	Tubers	Tubers are washed and peeled to eat.	Kunchpani, Jamudihi Section, Koira Range
Kumbhi	<i>Careya arborea</i>	Lecythidaceae	Bark	Decoction made from bark is used to treat diarrhoea.	Gonua, Koira Section, Koira range
Kurei	<i>Wrightia antidysenterica</i>	Apocynaceae	Bark	Bark is collected and macerated with water. One cup of juice is taken thrice per day to cure food poisoning.	Khajurdihi, Ranisal Section, Koira Range
Kuruma	<i>Haldina cordifolia</i>	Rubiaceae	Bark	Fresh stem bark juice is taken in rheumatism	San roxy, Jamudihi Section, Koira Range
Lata palas	<i>Butea superba</i>	Fabaceae	Leaves	The paste made from the leaves is useful for boils & swellings.	Paramsahi, Koira Section, Koira range
Lodha	<i>Symplocos racemosa</i>	Symplocaceae	Bark	Bark is macerated with water and this infusion is used to cure menstrual problems in women.	Kadadiha, Koira Section, Koira range
Lokachana	<i>Biophytum sensitivum</i>	Oxalidaceae	Whole plant	Whole plant decoction is taken orally in stomach ache	Puruna pani, Toda Section, Koira Range
Makarokranda	<i>Phanera retusa</i>	Fabaceae	Gum & Leaves	Gum is applied on sores and leaf bud is edible.	Jodipada, Koira Section, Koira range
Manjistha	<i>Rubia cordifolia</i>	Rubiaceae	Roots	Root is collected and dried. Dried roots are boiled with water. One cup of decoction is taken in morning in empty stomach to remove toxins from the blood.	Sargigarh, Ranisal Section, Koira Range
Matha saga	<i>Antidesma ghaesembilla,</i>	Phyllanthaceae	Leaves & Fruits	Powder of the leaves is used as leafy vegetable The fully ripen fruits are also eaten raw or cooked.	Kunchpani, Jamudihi Section, Koira Range
Mayurachulia	<i>Elephantopus scaber</i>	Asteraceae	Leaves	Leaf decoction is used is to treat cough.	Rengalbeda, Koira Section, Koira range
Mehendi	<i>Lawsonia inermis</i>	Lythraceae	Root	Root paste is mixed with sugar to treat jaundice.	Rengalbeda, Koira Section, Koira range
Modimodika	<i>Helicteres isora</i>	Malvaceae	Fruits	Dried fruits are boiled in mustard oil and the oil is used to massage new born baby.	Kunchpani, Jamudihi Section, Koira Range
Muturi	<i>Smilax zeylanica</i>	Smilacaceae	Stem	Stem is collected by the Munda community and used to clean tooth.	Toda, Toda Section, Koira Range
Pani ala	<i>Hedyotis ovatifolia</i>	Rubiaceae	Leaves	Leaves infusion taken as a tonic.	Toda, Toda Section, Koira

Local name	Botanical name	Family	Part(s) used	Mode & use(s)	Collection site(s)
Pita alu	<i>Dioscorea bulbifera</i>	Dioscoreaceae	Tubers	Tubers are edible. Tubers are kept in running water overnight then boil the tuber to eat. Roasted tubers are also edible.	Range Bhaliadihi, Koira Section, Koira range
Pokasunga	<i>Ageratum conyzoides</i>	Asteraceae	Leaves	Crushed leaves applied externally to cure cuts & wounds.	Kalta, Toda Section, Koira Range
Rohini	<i>Soymida febrifuga</i>	Meliaceae	Bark	Bark juice is taken once in empty stomach to cure chest pain.	San roxy, Jamudihi Section, Koira Range
Salaparni	<i>Desmodium triquetrum</i>	Fabaceae	Root	Root paste is mixed with warm water and taken twice a day to cure diarrhoea.	Teherei, Koira Section, Koira range
Sankhapuspi	<i>Evolvulus alsinoides</i>	Convolvulaceae	Whole plant	Plant paste is used to promote hair growth.	Sargigarh, Ranisal Section, Koira Range
Satavari	<i>Asparagus racemosus</i>	Asparagaceae	Roots	Root juice is used to reduce epilepsy.	Bad Roxy, Jamudihi Section, Koira Range
Siali	<i>Phanera vahlii</i>	Fabaceae	Root & Pods	Root decoction is used in fever. Pods are edible.	Kasira, Koira Section, Koira range
Sunari	<i>Cassia fistula</i>	Fabaceae	Bark & Leaves	Bark & leaves paste is used in skin infections.	Kusumdihi, Toda Section, Koira Range
Suta alu	<i>Dioscorea wallichii</i>	Dioscoreaceae	Tubers	Tubers are consumed as snacks by the tribal children.	Patudi, Ranisal Section, Koira Range
Syama lata	<i>Ichnocarpus frutescens</i>	Apocynaceae	Leaves	Decoction of dried leaves is used to treat diabetes.	Jhirpani, Toda Section, Koira range
Talamuli	<i>Curculigo orchioides</i>	Amaryllidaceae	Root	Root paste applied externally to cure piles.	Toda, Toda Section, Koira Range



Plate 3. Collection of information on Indigenous Traditional Knowledge from different sections of Koira Range, Bonai Forest Division, Odisha, India

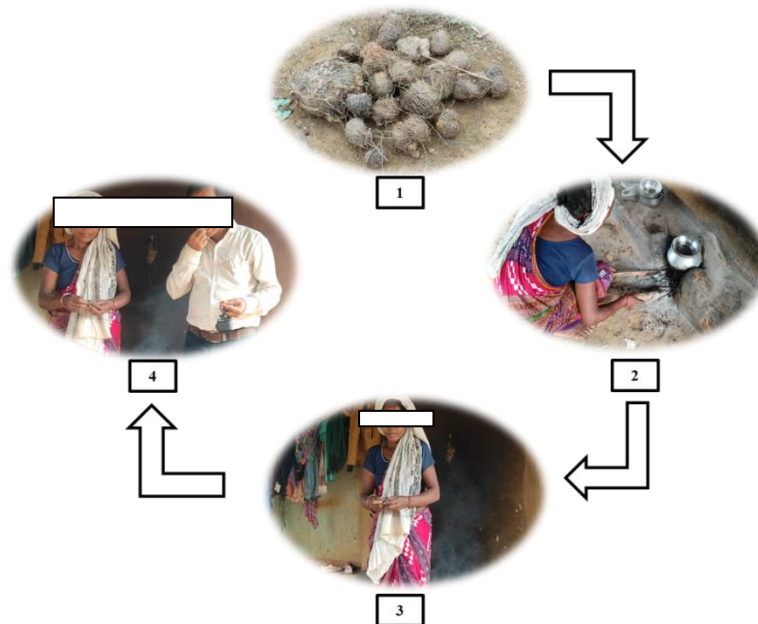


Fig. 2. Indigenous Traditional Knowledge on consumption of *Dioscorea bulbifera* tubers by Munda tribe 1) Collected tubers of *Dioscorea bulbifera*, 2) Tubers are roasted, 3) Peeling of roasted tubers, 4) Roasted tubers are consumed by the community and author

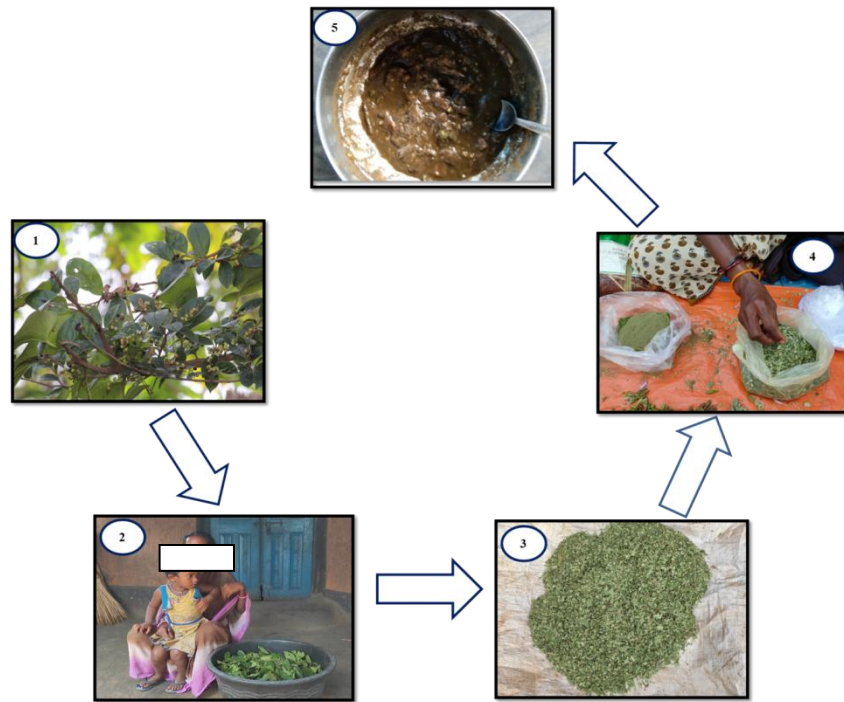


Fig. 3. Indigenous Traditional Knowledge on consumption of *Antidesma ghaesembilla* leaves by Munda tribe 1) Plant in wild, 2) Leaves of *Antidesma ghaesembilla* collected by Munda tribe, 3) Processing of leaves, 4) Selling in local market, 5) We tasted the dish made from the powered leaves

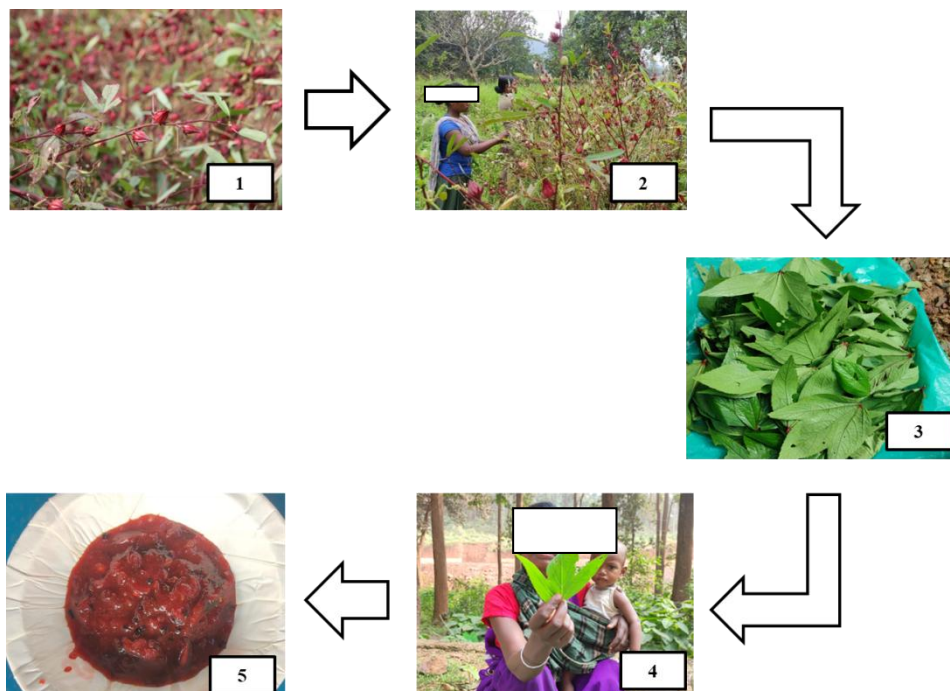


Fig. 4. Indigenous Traditional Knowledge on consumption of *Hibiscus sabdariffa* leaves and fruits by Munda tribe 1) Plant in wild, 2) Collection of leaves and fruit of *Hibiscus sabdariffa* 3 & 4) Selling in local market, 5) Chutney made from fruit of *Hibiscus sabdariffa*

4. DISCUSSION

There are numbers of research papers are published on traditional therapeutic knowledge from the state [6-10] but less or no reports are available from study areas. Recently Kumar et al. (2021) reported Some Common Medicinal Plants in Barsuan Range, Bonai Forest Division. They reported 50 medicinal plant species of 47 genera belonging to 32 families. Tribal communities in the study area mainly depend on medicinal plants to fight against diverse diseases and disorders like skin diseases, diabetes, rheumatism, jaundice, typhoid, fever etc.

5. CONCLUSION

Medicinal plants belongs to a huge plant group, represent the most ancient form of medication, used as traditional medicines in many countries throughout the world. It is not only a source of health care systems, but also having economic importance, traded extensively on scales ranging from the local to the international. Indigenous traditional knowledge is deep rooted in many countries of the world. Many communities have developed the indigenous knowledge systems to conserve and utilize their bio-wealth of their surroundings. The recognition of this knowledge of the traditional communities, which is now depleting day by day, is very much essential for the conservation of biodiversity as well as conservation of intellectual diversity. This article has included indigenous knowledge of different communities in Koira Range, Bonai Forest Division, Odisha which give traditional use(s) of the plants and their parts along with the reported pharmacological activities. This Indigenous Traditional Knowledge can be restored by creating awareness about its values and importance, as well as proper documentation.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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