Ethnomedicinal plants of Similipal Biosphere Reserve, Odisha, India: A comprehensive review on bark as the source of traditional medicine

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Review

Abstract

Background: The Similipal Biosphere Reserve (SBR) is located in the Mayurbhanj district of Odisha State of India, which is known for its rich ethnomedicinal plant species and indigenous tribal communities. The SBR provides the source of medicinal plants which are used by traditional healers of different communities residing in the forest fringe villages for preparation of ethnomedicines for treating a wide range of common ailments including gastrointestinal disorders, gynecological disorders, musculoskeletal disorders, other common health disorders like cold, cough, fever etc. So, the present review aims to systematically compile the traditional knowledge on the different medicinal uses of bark of both stem and root, their preparation methods and their application in treating various human diseases.

Methods: For present review, the relevant articles were retrieved from reputable electronic databases such as Scopus, Google Scholar, ScienceDirect, Academia.edu and Springer Nature. A total of 87 research papers which were published between 2001 and 2025 were collected through primary search and were considered for further screening. On the basis of predefined inclusion and exclusion criteria and after the title and abstract screening, 31 articles were selected for the final review. The literature search was performed using the following keywords: “ethnomedicine,” “bark as ethnomedicine,” “ethnomedicinal plants of Similipal Biosphere Reserve,” and “ethnomedicinal practices of the local tribes of Mayurbhanj district.” The botanical names, family, and growth habit of the recorded plant species were verified using online plant databases, including Plants of the World Online (POWO), The Plant List, and World Flora Online.

Results: A total of 110 ethnomedicinal plants (44 families, 76 genera) treating 61 diseases were documented from 31 research articles. The most dominant family is Fabaceae (10.9%). The most prominent genus was *Terminalia* comprised of 6 plant species. The most cited ethnomedicinal plant is *Holarrhena pubescens* mentioned by 9 authors. Notably 32.7% of plant species were reported to be used for diarrhea management. The most treated diseases category is gastrointestinal disorders (68.18%). Among the reported plant species, tree (70%) appeared as the dominant growth form followed by shrub (25.5%) and rest plants species were contributed by herb and liana which is less than 5%.
Conclusions: The present review pointed out the richness of medicinal plants in forest fringe areas of SBR and also showed the extensive use of EMPs by the local communities for treating various diseases. Yet, most of the plant species remain unexplored. So rigorous phytochemical and pharmacological studies are essential to confirm the therapeutic claims of these

ethnomedicinal plant species, which will lead to drug discovery, and strengthen conservation efforts linking biodiversity with traditional knowledge systems.

Keywords: Ethnobotany, Bark, Similipal Biosphere Reserve, Ethnomedicine

Background

The American botanist Dr. J.W. Hershberger first mentioned the word "ethnobotany" while delivering a speech in Philadelphia (Harshberger 1895). According to American botanist Dr. Hershberger, ethno-botany is the study which explicates the relationship between the tribal populations and plants. Ethno-botany elucidates the use of plants in their regular life for food, shelter, cloth, medicine and rituals (Harshberger 1896).

Among various plant parts used in preparation of traditional medicine, bark of both root and stem are considered as therapeutically important as bark is rich in polyphenols which have strong antimicrobial property. (Mukherjee 2017). In ethnomedicinal practice, the use of trunk or stem or root bark is considered effective over leaf and other plant parts. (Sadgrove *et al.*2025).

The therapeutic use of bark is popular in various ethnic culture all over the world. For example, in Chinese ethnomedicine, the dried bark of Eucommia ulmoides Oliv. is considered as super-class medicine, as it is used in curing liver and kidney diseases, in building up muscles & bone and in preventing spontaneous abortion. (Bao *et al.*2024).

In a research work, the author reported 99 species of EMPs whose bark are used in treating various disease by the Primitive tribes of Alluri Sitarama Raju District in Andhra Pradesh India. (Vidyullatha *et al.*2023).

The traditional Unani medicine has an important role in India's healthcare system (Prasad 2007). In Unani medicinal practice the bark is considered as strong astringent and is useful in treatment of diarrhea, ulcers, leucorrhoea. (Chopra 2002, Waring 2010, Nadkarni 2006).

Previous ethnobotanical studies conducted in and around the SBR have been geographically restricted to individual villages (Sinha *et al.*2021, Naik *et al.*2025, Pradhan & Nayak 2022), selected tribal communities (Rout &Thatoi 2009, Panda & Luyten 2018, Naik *et al.*2025), specific plant species (Rath *et al.*2009) or particular disease (Basuri *et al.*2024, Behera *et al.*2025, Panda *et al.* 2012, Singh *et al*.2010, Kar *et al.*2013). Instead of producing a thorough regional synthesis, most studies were aimed at documenting the traditional medicinal knowledge of specific communities. As a result, the available data remains fragmented, limiting the understanding of the overall diversity of bark-based ethnomedicinal plants, their therapeutic applications, and patterns of utilization across the biosphere reserve. This fragmentation also hampers the identification of frequently used species, cross-community comparisons, and the recognition of research priorities. To date, no systematic review has comprehensively synthesized the ethnomedicinal uses of bark from the Similipal Biosphere Reserve. Therefore, the present review addresses this gap by critically integrating the available literature to provide a comprehensive overview of bark-based ethnomedicinal plants, their traditional therapeutic applications, and existing research gaps. By consolidating dispersed knowledge, this review establishes a scientific baseline for future phytochemical, pharmacological, conservation, and sustainable utilization studies.

Bark tissues often accumulate secondary metabolites—alkaloids, tannins, flavonoids, and glycosides that confer antimicrobial, anti-inflammatory, and antioxidant properties (Thatoi *et al.*, 2008; Rout *et al.*, 2009). Moreover, bark harvesting is comparatively sustainable removing small sections of root or stem bark is less destructive than uprooting entire plants or stripping foliage, thereby minimizing ecological harm while ensuring continued plant survival (Behera *et al.*, 2025). Bark can be harvested in any time of the year without overly stressing a plant.

SBR of the state of Odisha has been included in World Network of Biosphere reserve in 2009. This biosphere covers an area of 4373 km^2 having more than 1000 vascular plants which includes 94 species of orchids (3 are endemic) and more than 300 medicinal plants. A total of 1265 villages are located inside the biosphere reserve where aboriginals represent 73% of total population. Recently the long pending National Park status has been approved in April 2025. (UNESCO 2009).

Although many researchers have recorded the ethno-medicinal use of different plant species belongs to SBR (Dikshit *et al.*2001, Behera 2006, Thatoi *et al*. 2008, Panda *et al*.2009, Rout *et al.*2009, Singh 2012, Panda *et al.*2013, Rout *et al.*2009, Sinha *et al.*2021, Basuri *et al.*2024, Behera *et al.*2025), a systematic documentation of use of a specific plant part along with

their mode of use remains limited. So, this review work will be the first to comprehensively cover the use of bark (root and stem) as ethno-medicine with their mode of use. So here an attempt to assemble the use of bark of EMPs of SBR, so that it can be available for the scientific society for the deeper research on bioprospecting of EMPs.

Materials and Methods

Study area

The SBR with a latitude 20^{0}17' to 22^0 34' North latitude and 85^0 40' to 87^0 10' East longitude is located in the northern part of the state Odisha in India. (Rout & Panda 2017). Similipal has unique flora of Western Ghats, Eastern Ghats and Sub-Himalayan plant species. It has four major forest types like tropical moist deciduous, dry deciduous hill forest, high land Sal Forest, grassland and Savanna. High annual precipitation and tropical climates support its evergreen forest (NTCA).

In the current literature survey, it has been found that, most of the ethnomedicinal research work by different researchers which includes direct interaction with the local herbalists were conducted in different places which fall under the transition zone of SBR. Few Places like Lulung, Sitakund and Devkund which are located inside the national park. Places which surround the SBR are inhabited by different local ethnic groups who mostly depends on traditional medicine prescribed by local herbalists or traditional healers. The ethnomedicinal practitioners mostly depend on nearby forest for raw materials which are used in preparing traditional medicine. So, the research worker preferably visits the forest fringe area both for the local traditional healers and ethnomedicinal plants from forest. The research places were collected from the all the literature and broadly categorized into 10 places which were shown in the map given below as red dots. The map was prepared by using QGIS software. The location map showing in figure 1. includes spatial location of SBR in Mayurbhanj district along with two inset maps indicating position of Odisha state in India and position of Mayurbhanj in Odisha. For better orientation of the map, a north arrow is given which indicates better direction of the locations. A scale bar is given for spatial reference. For better visualization, the core zone and transition zones are highlighted.

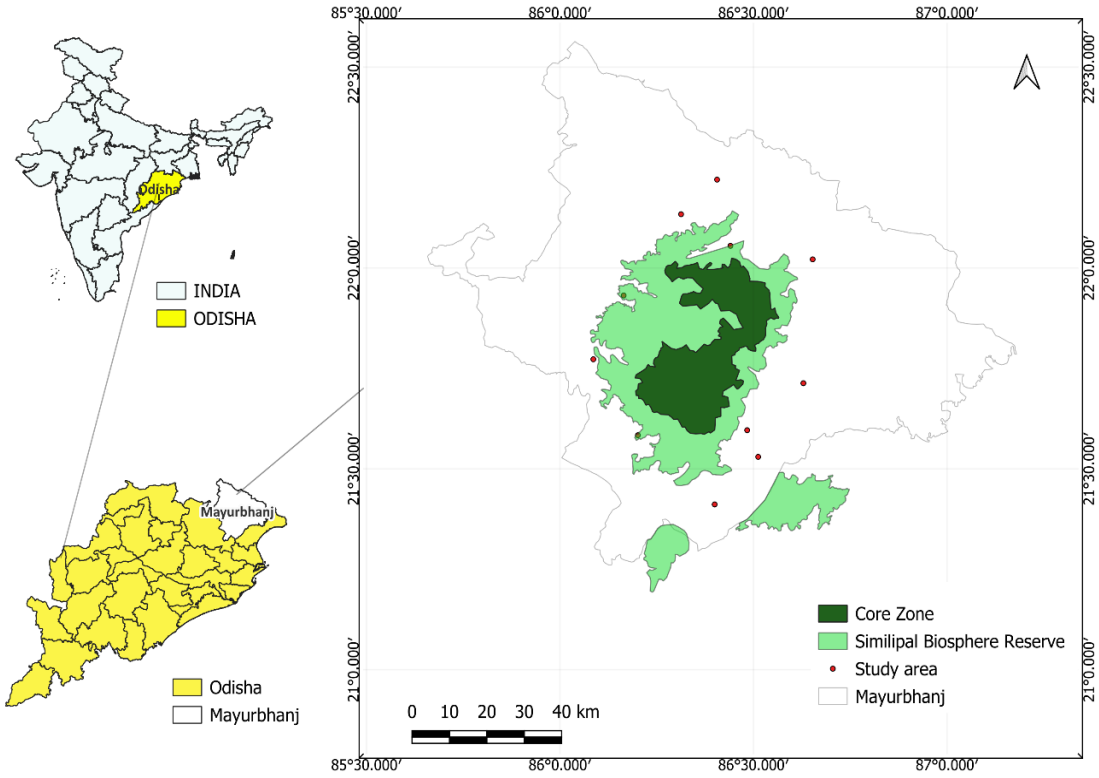

Figure 1. Location Map showing different study areas around the transition zones of SBR

Search Strategy for data collection

A thorough literature search was conducted to find studies and articles based on describing ethnomedicinal usage of plants by various ethnic groups in and around the Similipal Biosphere Reserve (SBR). Relevant literatures published between 2001 to 2025 were retrieved using electronic databases including Academia.edu, Elsevier, Google Scholar, ResearchGate, PubMed and Springer Nature. Various combination of key words relevant to ethnomedicinal plants of SBR and bark based ethnomedicine were employed to search the related literature. To collect the relevant literatures, a search strategy was employed using different key words related to ethnomedicine, ethnomedicinal parts, bark as ethnomedicine, ethnomedicinal plants of Similipal Biosphere Reserve, Mayurbhanj. The primary search string used to retrieve data was: ("ethnomedicine" OR "ethnomedicinal plants" OR "traditional medicine") AND ("bark" OR "stem bark" OR "root bark") AND ("Similipal" OR "Similipal forest", OR "Similipal biosphere reserve" OR "Mayurbhanj"). Further searches with related key words were performed to capture additional studies. The searches were conducted in Academia Edu, Elsevier, Google scholar, ResearchGate, PubMed, Springer Nature in between July and October 2025.

Literature screening Criteria

There are two phases in literature search criterion. In the 1st phase, the title and abstract of the collected literatures were screened while in the subsequent phase the relevant articles were downloaded for additional analysis. The screening of literature was done according to inclusion exclusion criteria.

Inclusion criteria

The search for publications and book chapters on bark as ethnomedicine from SBR published between 2001 and 2025 is included in this study.

Exclusion criteria

The following categories of data were excluded from the present study:

1. Data from the studies that are not peer-reviewed.
2. Data from the studies that had no information about ethnomedicinal use of bark.

A total of 87 research and review articles related to the use of plants as ethno-medicine by different ethnic groups from SBR were initially identified and retrieved. After careful screening of titles, abstracts and full texts, 39 articles were excluded as they contained information which were out of focus of the present review. The remaining 48 articles were thoroughly evaluated in depth. Studies those reported the medicinal use of bark (stem bark or root bark) were included. The eligibility of the remaining 48 articles was determined when they were retrieved. Of these 48 articles, 17 articles were excluded, including 5 that were not peer-reviewed and 12 that did not record the ethnomedicinal use of bark. Consequently, 31 articles that established qualifying requirement were added to the final review. The PRISMA 2020 flow diagram (Figure 2) shows the study identification, screening, eligibility evaluation, and inclusion procedure.

Quality Appraisal for included studies

The 31 included studies relevant to bark as ethnomedicine from SBR were assessed manually for their methodological quality. MS Excel was used to develop a scoring framework that covered 5 criteria i.e., study design, data collection, data analysis, reporting transparency and risk of bias. Each criterion was evaluated as fulfilled (01), partially fulfilled (0.5) and not fulfilled (0) and then the studies were categorised as high, moderate and low.

Data compilation and taxonomic verification

The retrieved information included botanical names with proper citation of the recorded medicinal plants, family name, local name, local name, plant parts used, disease treated, preparation techniques along with route of administration and references. The scientific names and correct author citations of the documented ethnomedicinal plant species were cross-checked and verified using online plant database Plants of The World Online (POWO, Royal Botanical Garden, Kew) and other additional reliable online data bases for ensuring taxonomic accuracy.

Methods of Cartographic representation of collected data

The current review literature includes all the plants whose bark is used in preparation of ethnomedicine and the resulted data relevant to the plants are displayed in tabular form. The information about scientific name of the plants, their family, habit, local name, disease treated, mode of preparation of medicine, mode of administration has been tabulated in Table 1.

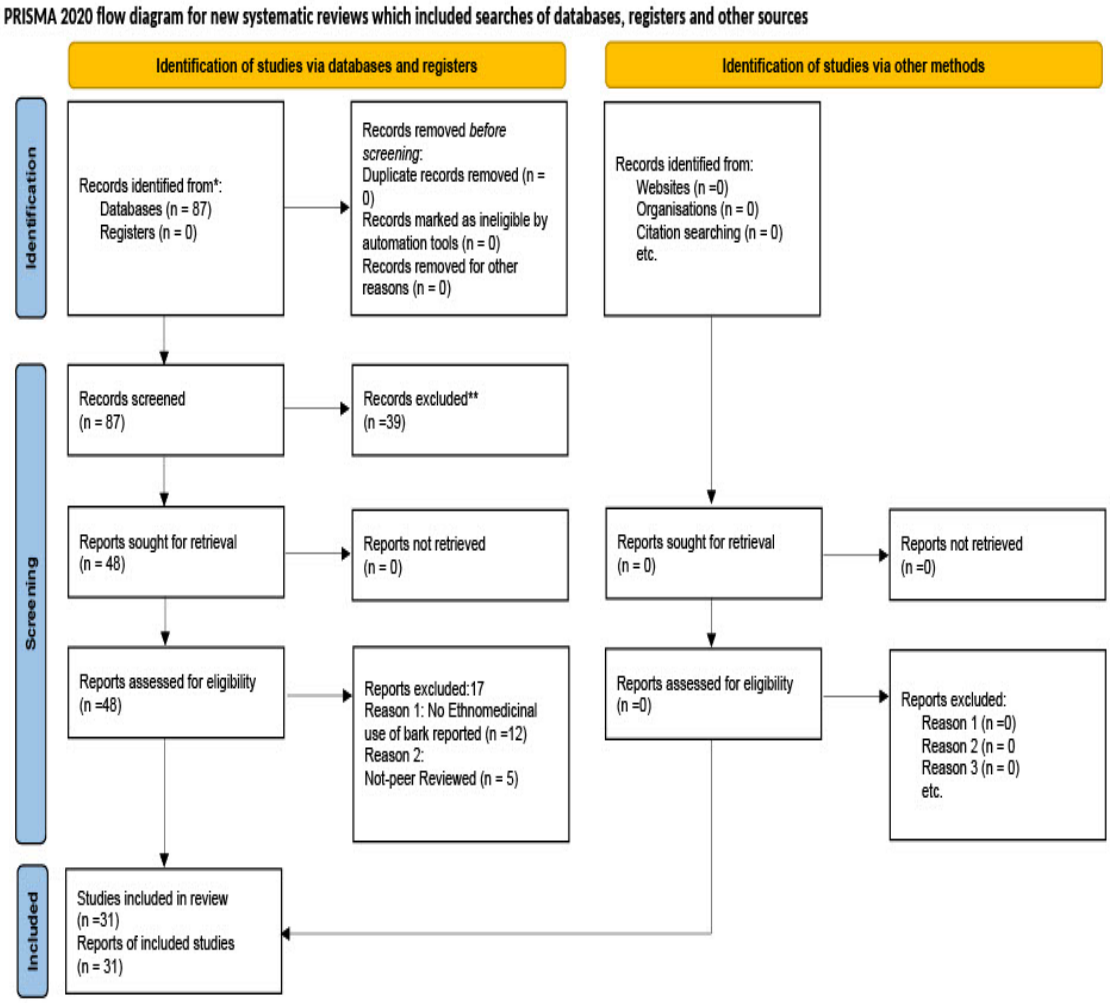

Figure 2. Prisma analysis guideline

Figure 3 represents the chord diagram having distribution of plant species among families while the Figure 4 shows a pie of pie chart which represents genus wise distribution of plants. While the figure 5 shows a bar graph which represents number of EMPs used for the treatment of different diseases. The recorded growth and habits of EMPs are represented in bar graph in figure 6. The figure 7 shows an alluvial diagram which was prepared to visualize the relationship between plant bark types (stem bark and root bark) and their different modes of preparation of traditional medicine for different ailments. The chord diagram was prepared by using RAWGraph application. The pie of pie chart and bar graph was prepared using MS Excel while the bar graph (figure 6) and alluvial diagram was prepared by using Rstudio with appropriate packages in R.

Table 1. Literature-documented ethnomedicinal uses of plant bark from the forest-fringe areas of Similipal Biosphere Reserve, Odisha, India.

Plant species	Habit	Family	Local Name	Disease treated	Mode of Use	Reference
Acacia catechu (L.f) Willd	Tree	Fabaceae	Khaira	Diarrhea	Stem bark, two to three *Piper longum* and two to three insects attached to the *Ocimum sanctum* plant are combined to make a paste that is taken three times a day for three months to treat night blindness. Not Reported	(Behera 2006) (Kar *et al*. 2013)
Acacia leucophloea (Roxb.) Willd	Tree	Fabaceae	Kanta Sirisa	Diarrhea, Dental problem	To treat diarrhea, the bark is soaked in cold water overnight before the decoction is administered in the morning. To treat dental caries in children, bark decoction with ghee is used topically.	(Panda *et al*.2011)
Acacia sinuata (Lour.) Merr.	Climbing shrub	Fabaceae	Sikakai, Ritha	Malaria	The stem bark glue is utilized to control Malaria	(Sinha *et al*.2021)
Achyranthes aspera L.	Sub shrub	Amaranthaceae	Apamaranga	Sprain, Dysentery & Constipation	Not Reported	(Rout & Panda 2010)
Alangium salviifolium (L.f) Wang.	Tree	Alangiaceae	Ankula	Dysentery	Not Reported	(Kar *et al.*2013)
Albizia lebbeck Benth.	Tree	Fabaceae	Sirisa	Diarrhea	Not Reported	(Kar *et al*.2013)
Albizia procera (Rox.) Benth.	Tree	Fabaceae	Dhala siris	Rheumatism	Not Reported	(Dimri *et al*.2021)
Alstonia scholaris (L.) R. Br.	Tree	Moraceae	Chatina, Saptaparni	Jaundice, Diarrhea and Dysentery, Urine Infection, Malaria	The stem bark decoction combined with 10-15 *Piper nigrum* and *Mangifera indica* bark are taken twice daily for three days to heal jaundice. The bark juice helps in treating dysentery and diarrhea. Not Reported Condensed bark juice is useful in urinary infection.	(Rout *et al.* 2012) (Panda *et al*. 2013) (Kar *et al*.2013) (Sinha *et al*. 2021) (Behera *et al*. 2025)

					Stem bark decoction is useful in treating malaria.	
Anogeissus latifolia (DC.) Wall. Ex Guill. &Perr.	Tree	Combretaceae	Dharua	Diarrhea	Not Reported To treat diarrhea, 5 grams of powdered bark is consumed two to three times a day. The powdered bark (5 gm) is taken 2-3 times a day for curing diarrhea. Not Reported Bark powder is taken to cure diarrhea. Not Reported	(Rout *et al*.2005) (Panda *et al*.2011) (Rout & Panda 2017) (Kar *et al*.2013) (Panda 2013) (Dimri *et al*.2021)
Anthocephalus chinensis (Lam.) A. Rich. Ex. Walp.	Tree	Rubiaceae	Kadamba	Eye inflammation, Stomach pain, Diarrhea	To treat eye inflammation, 3 grams of stem bark paste along with 1 gram of table salt is given. Not Reported Paste of bark is taken to cure stomach pain.	(Behera 2006) (Kar et al.2013) (Panda *et al*.2013)
Anthocephalus indicus A. Rich	Tree	Rubiaceae	Kadamba	Fever, Diarrhea, Vomiting	For two to three days, the stem bark decoction is taken orally twice a day to cure fever.	(Parida 2019)
Aporosa octandra (Buch. Ham. exD.Don) Vickery	Tree	Phyllanthacea	Makania	Abscess	Not Reported	(Panda *et al*.2017)
Aquilaria agallocha Roxb.	Tree	Thymelaceae	Agaru	Carminative, Cardio tonic, Energizer	The bark powder is used to cure the mentioned ailments restoratively.	(Sinha *et al*.2021)
Azadirachta indica A. Juss.	Tree	Meliaceae	Nimba	Nasal bleeding, Fever and Skin problems, Skin infection, Liver disease, Malaria	Not Reported Not Reported Not Reported Bark decoction is useful in malaria.	(Rout & Panda 2010) (Dimri *et al*.2021) (Basuri *et al*.2024) (Behera *et al*.2025)
Bauhinia purpuria L.	Shrub or small tree	Fabaceae	Kuliari	Diarrhea	Not Reported	Kar *et al*.2013
Bauhinia racemosa Lam.	Shrub or small tree	Fabaceae	Anmata	Dysentery	Not Reported	(Kar *et al*.2013)
Bauhinia vahlii Wight & Arn.	Creeper	Fabaceae	Siali	Dysentery	To treat dysentery, the stem bark and lime are combined to make a paste that	(Panda *et al*.2011)

					is administered twice daily for three days. Not Reported	 (Kar *et al*.2013)
Bauhinia variegata L.	Shrub or small tree	Fabaceae	Kanchana	Obesity, Dysentery	15 ml of root bark decoction is taken daily for one month continuously to reduce excess body weight. Not Reported The decoction of root bark is useful in reducing excess body weight.	(Behera 2006) (Kar *et al*.2013) (Panda *et al*.2013)
Boswellia serrata Roxb.	Tree	Burseraceae	Salia	Diarrhea	Not Reported	(Kar *et al*.2013)
Buchanania lanzan Spreng	Tree	Anacardiaceae	Chara	Mouth soar, Chronic wound, Mouth soar, constipation	The bark and root are mix together and made to paste and is applied on chronic wounds. The bark is steeped in hot water, and the resultant infusion is useful in curing mouth soar. The bark infusion is useful in constipation. Not Reported	(Rout *et al*.2005) (Thatoi *et al*.2008) (Panda *et al*.2011) (Dimri *et al*.2021)
Butea superba Roxb. ex Willd.	Tree	Fabaceae	Nali Palash	Fever	The bark paste is helpful in fever.	(Panda 2013)
Callicarpa macrophylla Vahl.	Shrub	Lamiaceae	Daya	Stomach pain	Stomachache is treated with bark paste.	(Panda 2013)
Careya arborea Roxb.	Tree	Lacythidaceae	Kumbhi	Blood dysentery, Piles, indigestion, Diarrhea, Cholera.	The bark juice with the root of *Indigofera cassioides* is helpful in treating blood dysentery. To treat piles, a glass decoction of 50 grams of stem bark is used once daily for a week on an empty stomach. Indigestion and stomach gas can be relieved by consuming a paste made from stem bark and cumin with water. Not Reported	(Mohanta *et al*.2006) (Rout & Thatoi 2009) (Panda *et al*.2011) (Kar *et al*.2013)
Calotropis gigantea (L.) W.T. Aiton	Large shrub	Asclepiadaceae	Arakha	Cold and Cough, Respiratory problem, Snake bite	Not Reported	(Dikshit *et al.*2001)

Cassia fistula L.	Tree	Fabaceae	Sunari	Snake bite, Skin Infection, Clogging issues.	To treat a snake bite, apply bark paste topically three times a day for two to three days. To heal from a scorpion bite, the injured region is treated with bark paste. Skin infections are treated using bark paste. Not Reported A decoction of bark is given on an empty stomach to ease clogging problems. The glue of bark and leaf decoction juice together useful in fighting jaundice.	(Mohanta *et al*.2006) (Rout *et al*.2012) (Panda 2013) (Dimri *et al*.2021) (Rout *et al*.2009) (Sinha *et al*.2021)
Cassia occidentale L.	Under shrub	Fabaceae	Kala Chakunda	Liver disease	Not Reported	(Basuri *et al*.2024)
Catunaregam spinosa (Thunb.) Tirveng	Shrub	Rubiaceae	Kalaikanta	Diarrhea and Dysentery	Not Reported	(Kar *et al*.2013)
Celastrus paniculatus Willd.	Tree	Celastraceae	Pingu	Abortion in female, Cold, Rheumatism, Stomach pain, Male Infertility, Malaria	Not Reported Acute stomachaches are treated with stem bark juice. To treat insufficient sperm count, bark powder, *Withania somnifera*, crystal sugar, and *Syzygium aromaticum* are taken together orally once daily for 15 days. Root bark powder is taken for treating malaria.	(Dikshit *et al*.2001) (Rout *et al*.2005) (Panda *etal*.2011) Rout *et al*. 2012) (Singh 2012) (Behera *et al*.2025)
Clausena excavate Burm.f.	Small tree	Rutaceae	Agnijal	Dysentery, Fever	The boiled juice of bark mix with bark juice of *Holarrhena pubescens to* treat dysentery. The bark juice also helpful in treating fever.	(Sinha *et al*.2021)
Crateva nurvala Buch. -Ham.	Tree	Capparaceae	Barun	Female Contraceptive	In order to prevent conception, women are given a mixture of one gram of black pepper powder and three milliliters of fresh stem bark juice on the seventh day of their monthly period.	(Behera 2006)

Croton roxburghii Balak	Shrub / Tree	Euphorbiaceae	Putudi	Sore throat and Contraceptive, Dysentery	Not Reported Dysentery is treated for two to three days using a paste made from stem bark and a small amount of salt.	(Rout *et al*.2005) (Rout & Panda 2017)
Dalbergia sissoo Roxb.	Tree	Fabaceae	Sisu	Lumbago, Blood disease.	A paste produced from freshly obtained stem bark is applied to the afflicted area over a period of fifteen days. Bark decoction. Not Reported	(Singh 2012) (Dimri *et al*.2021)
Dillenia aurea Sm.	Tree	Dilleniaceae	Rai	Health revitalization in women	After giving birth, women are given 10 milliliters of stem bark aqueous extraction every day on an empty stomach for a continuous month to improve their health.	(Behera 2006)
Dillenia pentagyna Roxb.	Tree	Dilleniaceae	Rai	Blood dysentery	One milliliter of lime water and two milliliters of stem bark decoction are administered daily before meals to treat blood dysentery.	(Behera 2006)
Diospyros malabarica (Desr.) Kostel	Tree	Ebenaceae	Kala Kendu, Dhusara Kendu/ Mankada Kendu	Diarrhea, Dysentery, Skin disease,	Not Reported Bark paste	(Kar *et al*.2013) (Dimri *et al*.2021)
Diospyros melanoxylon Roxb	Tree	Ebenaceae	Kendu	Dyspepsia, Diarrhea and Dyspepsia, skin disease, Diarrhea.	Diarrhea and dyspepsia can be effectively treated with the bark decoction. Bark paste is applied in skin disease. Not Reported	(Thatoi *et al*.2008) (Panda 2013) (Kar *et al*.2013)
Dolichandrone spathacea (L. f) K. Schum	Tree	Bignoniaceae	Pannir	Disease related to gastrointestinal.	Not Reported	(Dimri *et al*.2021)
Erycibe paniculata Roxb.	Liana	Convolvulaceae	Chain katha, Joda koli	Fever, Cholera; Cholera, Dysentery	In fever, the patient is advised to chew the bark twice a day for betterment. The juice of bark also useful in treating cholera.	(Panda *et al*.2011)

					Not Reported	(Kar *et al*.2013)
Ficus benghalensis L.	Tree	Moraceae	Bara	Fissure, Dysentery,	To treat fissures, the stem bark juice is used twice daily for three to four weeks combined with a paste made from adventitious root of the plant and *Syzygium aromaticum* (three to four cloves). Not Reported	(Rout *et al*.2009) (Kar *et al*.2013)
Ficus racemosa L.	Tree	Moraceae	Dimiri	Leucorrhoea, Diarrhea	The stem bark is pounded into a paste, which is then cooked in water to a capacity of 100 millimeters. For fifteen days, this juice is consumed prior to meals to cure leucorrhoea. Not Reported	(Singh 2012) (Kar *et al*.2013)
Ficus religiosa L.	Tree	Moraceae	Aswastha	Lymph Node swelling under the arm pit, Skin disease, Vomiting	One millimeter of lime water and three grams of stem bark paste are administered to treat lymph node enlargement behind the arm pit. To treat skin conditions, 5 grams of *Curcuma longa* powder and 50 grams of stem bark are applied externally. Not Reported Bark powder is beneficial for the treatment of skin conditions.	(Behera *et al*.2006) (Rout *et al*.2009) (Rout & Panda 2010) (Panda 2013)
Ficus semicordata Buch. Ham. ex Sm.	Tree	Moraceae	Bhuin Dumri	Dysentery	Not Reported	(Dimri *et al*.2021)
Flacourtia indica (Burm.f.) Merr.	Under shrub	Salicaceae	Kanteikoli	Eczema, Eczema	The eczema spot is scraped before applying stem bark paste to the afflicted areas. Topical application is helpful in curing eczema.	(Behera 2006) (Panda 2013)
Glycyrrhiza glabra L.	Perennial herb	Fabaceae	Yastimadhu	Diarrhea	Not Reported	(Rout & Panda 2010)

Gmelina arborea Roxb.	Tree	Verbenaceae	Gambhari	Aseptic washing, Washing and healing of septic wound.	Wounds can be healed and cleaned aseptically with root bark decoction. Septic wounds are cleaned with a root bark decoction.	(Behera 2006) (Panda *et al*.2011)
Grewia abutilifolia Vent. ex Juss.	Tree	Malvaceae	Mirga, Ryna	Dysentery.	Not Reported	(Kar *et al*.2013)
Haldina cordifolia (Roxb.) Ridsd.	Tree	Rubiaceae	Kuruma	Eye redness, Eye dryness, Cholera	The bark decoction is applied externally on eyes to decrease eye redness. Bark decoction is filtered and used in eye dryness. Not Reported	(Rout *et al*.2009) (Panda 2013) (Dimri *et al*.2021)
Helicteres isora L. G. Don	Shrub or tree	Sterculiaceae	Murimurika	Diarrhea, Dysentery	Not Reported	(Kar *et al*.2013)
Hibiscus rosa-chinensis L.	Large shrub	Malvaceae	Jaba, mandara	Abortifacient	To terminate premature foetus, 15 grams of stem bark paste is given for five days.	(Behera 2006)
Holarrhena antidysenterica (G. Don) Wall. ex A.DC.	Tree	Apocynaceae	Kurchi	Diabetes, Dysentery.	The bark decoction with leaf juice of *Gymnema sylvestre* is taken to control diabetes. Not Reported	(Thatoi *et al*.2008) (Kar *et al*.2013)
Holarrhena pubescens (Buch. - Ham.) Wall. Ex G. Don	Tree	Apocynaceae	Kulchi	Snake bite, Dysentery and Malaria, Dysentery, amoebic and blood dysentery, Amoebic dysentery, Malaria, piles	To treat snake bites, the bark of *Holarrhena pubescens* and the roots *of Rauvolfia serpentina* and *Cassia tora* are pasted together and applied to the injured areas twice over the course of two days. Honey and stem bark decoction in the proportion 3:1 is prescribed once daily to alleviate diarrhea. To treat acute skin diseases, 10 grams of bark powder are applied twice a day for ten days to the afflicted areas. To treat gastrointestinal disorders, equal amounts of the bark and roots of *Cardiospermum halicacabum* and	(Mohanta *et al*.2006) (Behera 2006) (Rout *et al*.2009) (Panda *et al*.2011)

					Solanum torvum are crushed, combined with a pinch of salt, and consumed twice a day. Not Reported To treat dysentery, a 3:1 infusion of stem bark and honey is given once daily. Stem bark powder combined with black pepper is used to cure malaria. It is recommended to use ¾ the anna amount of bark powder with honey to treat piles. To treat malaria, bark powder is given orally.	 (Kar *et al*.2013) (Dikshit *et al*.2016) (Rout and Panda 2017) (Sahu *et al*.2023) (Behera *et al*.2025)
Holoptelea integrifolia (Roxb.) Planch.	Tree	Ulmaceae	Charla	Scabies	Not Reported	(Dimri *et al*.2021)
Huberantha cerasoides (Roxb.) Chaowasku	Tree	Annonaceae	Champati	Diabetes	Not Reported	(Dimri *et al*.2021)
Ixora pavetta Andr.	Shrub /Tree	Rubiaceae	Patra koria	Urine infection and Dysentery.	Bark decoction is helpful in treating urine infection and dysentery.	(Panda 2013)
Jatropha gossypifolia L.	Shrub	Euphorbiceae	Baigaba	Scabies	Bark juice is useful in treating scabies	(Panda 2013)
Lannea coromandelica (Houtt.) Merr.	Tree	Anacardiaceae	Raji-mohi	Diarrhea, Dysentery, worm and Skin infection.	Not Reported Not Reported	(Kar *et al*.2013) (Panda *et al.*2017)
Largerstroemia parviflora Roxb.	Tree	Lythraceae	Solokha	Diabetes	Not Reported	(Rout *et al*.2005)
Litsea glutinosa (Lour.) C.B. Rob	Tree	Lauraceae	Ledhachhali	Wound, Wound healing, Diarrhea, Dysentery	Bark paste is applied on wound to heal. Bark juice Not Reported	(Rout *et al*.2009) (Panda 2013) (Kar *et al*.2013)
Litsea monopetala (Roxb.) Pers.	Tree	Lauraceae	Pajo, Bagha-Airi, Bastura	Boils, Gastrointestinal disorders, Wound, Intestinal problem.	Boils are treated with the bark paste. Stem bark juice is used to treat gastrointestinal disorders. Not Reported The bark juice is used in gastrointestinal disorder.	(Thatoi *et al*.2008) (Rout *et al*.2009) (Rout & Panda 2010) (Panda 2013)
Lawsonia inermis L.	Shrub	Lythraceae	Manjuati	Jaundice, Ulcer in mouth, Fever and Cold.	Not Reported	(Rout & Panda 2010)

Madhuca longifoilia (Koenig) Macbride	Tree	Sapotaceae	Mahula	Dental cavities & other Dental problems, diabetes	After boiling stem bark, the decant is used to wash teeth in order to keep overall dental health and prevent cavities.	(Rout *et al*.2012)
Mangifera indica L.	Tree	Anacardiaceae	Amba	Blood dysentery, Diarrhea, Dysentery, Cholera.	To treat bleeding dysentery, the stem bark decoction is administered twice daily for three days. To treat bleeding dysentery,15 ml of stem bark decoction is given twice a day for three days. Not Reported	(Behera 2006) (Panda *et al*.2011) (Kar *et al*.2013)
Michelia champaca (L.) Baill. ex-Pierre	Tree	Magnoliaceae	Champa	Menorrhagia in women	During excessive menstrual bleeding, the bark paste long with flower paste of *Woodfordia fruticosa* is administered twice daily for a week.	(Rout *et al*.2012)
Millettia pinnata (L.) Panigrahi	Tree	Fabaceae	Karanja	Post delivery bleeding in female	Bark extract is used to check excess bleeding in women after childbirth.	(Parida *et al*.2019)
Mimusops elengi L.	Tree	Sapotaceae	Boula	Diarrhea, Dysentery	Not Reported	(Kar *et al*.2013)
Morinda coreia Buch. Ham.	Small tree	Rubiaceae	Molagu	Joint pain	The painful joint area is treated topically with the stem bark paste.	(Singh 2012)
Morinda tinctoria Roxb.	Tree	Rubiaceae	Chayalee	Joint pain	A paste is made by grinding the stem bark with water and applying it to the affected area.	(Singh *et al*.2010)
Morus australis Poiret	Tree	Moraceae	Tutkoli	Fontanale	The delicate area of the newborn's skull is covered with a paste made from root bark.	(Rout *et al*.2012)
Nyctanthes arbour-tristis L.	Tree	Oleaceae	Singarhar	Malaria	The bark decoction is very useful to cure malaria.	(Panda 2013)
Oroxylum indicum L. (Vent.)	Tree	Bignoniaceae	Phampana	Hypermenorrhea, Diarrhea and Dysentery, also used as astringent.	Women with hypermenorrhea are treated with a 2 ml stem bark decoction and one gram of salt. Root bark is used to treat dysentery and diarrhea, while stem bark paste is	(Behera 2006) (Thatoi *et al*.2008)

					applied to the afflicted area and knotted for 28 days to treat bone fractures. To increase appetite, a glass of stem bark decoction is taken in the morning for three days. In the treatment of rheumatic pain, 1 teaspoon of stem bark juice along with one cup milk is given twice daily. Not Reported Not Reported	(Rout & Thatoi 2009) (Rout *et al*.2009) (Kar *et al*.2013) (Dikshit *et al*.2016)
Polyalthia cerasoides (Roxb.) Bedd.	Tree	Annonaceae	Patamashu, Champati	Diabetes. Reptile bite. Scorpion bite	To manage diabetes, five grams of stem bark are crushed with water, and the filtered juice is taken once daily for five to ten days. Not Reported The bark powder is act as antitodes to scorpion bite.	(Rout *et al*.2009) (Panda *et al.*2011) (Panda 2013)
Polyalthia longifolia (Sonn.) Benth. & Hook.f. ex-Thwaites	Tree	Annonaceae	Debadaru	Gout	Dried stem bark powder is administered orally with warm water for seven days to treat gout.	(Singh 2012)
Pongamia glabra Vent.	Tree	Fabaceae	Karanja	Precaution to prevent tetanus	The bark juice is tempered in hot iron taken orally immediately after delivery to prevent tetanus in pregnant women.	(Thatoi *et al*.2008)
Psidium guajava L.	Tree	Myrtaceae	Pijuli, Peda	Blood dysentery	To treat bleeding dysentery, the bark of *Psidium guajava* and *Mangifera indica* are crushed together and their juice is consumed.	(Parida 2019)
Pterocarpus marsupium Roxb.	Tree	Fabaceae	Piasala	Dysentery, Blood Dysentery, Hematochezia.	The bark juice of *Pterocarpus marsupium* and *Schleichera oleos*a long with cold water is very useful to treat dysentery. To treat diabetes, the bark is steeped in water for the entire night and consumed every day before meals. The bark powder is useful in treating dysentery.	(Mohanta *et al*.2006) (Rout *et al*.2009) (Panda 2013)

					Not Reported To treat blood dysentery, a 2-inch-sized bark paste composed from equal parts of *Pterocarpus marsupium*, *Mangifera indica*, *Shorea robusta*, and *Spondias pinnata* is taken once daily. 2-inch size of bark of equal amount of *Pterocarpus marsupium*, *Mangifera indica*, *Shorea robusta* are crushed and the juice is used to treat hematochezia.	(Kar *et al*.2013) (Rout & Panda 2017) (Sinha *et al*.2021)
Pterospermum acerifolium (L.) Willd.	Tree	Malvaceae	Muchukunda	Diarrhea and Dysentery	The powdered bark is used to treat dysentery and diarrhea.	(Panda 2013)
Pterospermum heyneanum Wall.	Tree	Fabaceae	Barahakani	Gout	After grinding the stem bark with water, the paste is administered to the afflicted areas for three to four days to treat gout.	(Singh *et al*.2010)
Saraca asoca (Roxb.) W.J. De Wilde	Tree	Caesalpiniaceae	Ashoka	Gynecological disorder, Dysentery, Blood dysentery, Blood dysentery	Bark powder is taken in gynecological disorders Bark decoction is useful in fixing dysentery. Not Reported Stem bark decoction is useful in blood dysentery. Useful in Gynecological issues.	(Rout *et al*.2009) (Panda 2013) (Kar *et al*.2013) (Rout & Panda 2017) (Sinha *et al*.2021)
Schleichera oleosa (Lour.) Oken	Tree	Sapindaceae	Kusuma	Skin itching	The paste of stem bark is applied on affected area before bed.	(Behera 2006)
Securinega virosa (Roxb.exwilld). Baill	Shrub or small tree	Euphorbiaceae	Kanilehya	Diarrhea	Not Reported	(Kar *et al*.2013)
Shorea robusta C.F. Gaertn	Tree	Dipterocarpaceae	Sala	Dysentery, Mouth ulcer	Bark juice of *Shorea robusta* is mixed with leaf of *Kalanchoe pinnata* and taken orally to cure dysentery. The stem bark juice is used to cure mouth ulcer.	(Mohanta *et al*.2006) (Parida 2019)

Solanum virginianum L.	sub shrub	Solanaceae	Bhejibaigan	Malaria	The root bark paste is taken for 5-7 days in the treatment of malaria.	(Sinha *et al*.2021)
Sida cordifolia L.	Sub shrub	Malvaceae	Bisiripi	Chronic dysentery	Root bark powder is administered orally together with milk and sugar to cure persistent diarrhea.	Rout & Panda.2017)
Soymida febrifuge (Roxb.) A. Juss	Tree	Meliaceae	Ruhini	Anemia, Dysentery, Colic	5 ml of stem bark decoction is given post lunch twice a day for one month to cure anaemia in women. The bark juice is very effective against dysentery. To treat colic, an equal amount of bark powder and *Terminalia chebula* fruit are combined with water and consumed three times a day.	(Behera 2006) (Rout *et al*.2009) (Rout & Thatoi 2009)
Spondias pinnata (L. f.) Kurz	Tree	Anacardiaceae	Amda	Dysentery, Muscular pain, Joint pain.	Bark juice of *Spondias pinnata and* fruit of *Musa paradisiaca* are mixed together and used in the treatment of dysentery. Massage with topical application of mixture of root bark paste (5 gm) and mustard oil (1 ml) can relieve muscular pain. Bark juice of both *Spondias pinnata* and *Syzygium cumuni* are useful in treatment of dysentery. Not Reported Bark paste is applied on painful joints.	(Mohanta *et al*.2006) (Behera 2006) (Panda *et al*.2011) (Rout & Panda 2017) (Sahu *et al*.2023)
Streblus asper Lour.	Tree	Moraceae	Sahada	Elephantiasis, Dysentery.	Elephantiasis patients are given 10 grams of stem bark paste once daily for a month. Not Reported Three table spoons of bark juice are consumed three times a day for diarrhea.	(Behera 2006) (Kar *et al*.2013) (Sahu *et al*.2023)

Sterculia urens Roxb.	Tree	Malvaceae	Kudalo	Vomiting	A mixture of bark powder and a small quantity of water is taken to relax from vomiting.	(Panda *et al*.2011)
Strychnos nux-vomica L.	Tree	Loganiaceae	Kochila	Scabies, Malaria	Topical application of bark juice of *Strychnos nux-vomica* along with 7 tsp of extracted juice of leaves of *Vitex negundo* is useful in treating scabies. The bark root is used for 5-7 days to control malaria infection.	(Mohanta *et al*.2006) (Sinha *et al*.2021)
Suregada multiflora (A. Juss.) Baill.	Tree	Euphorbiaceae	Khakra	Diarrhea	Not Reported	(Panda *et al*.2017)
Syzygium cumini (L.) Skeels	Tree	Myrtaceae	Jamu	Diarrhea	Not Reported	(Kar *et al.*2013)
Syzygium cerasoides (Roxb.)Chatterjee & Kanjilal	Tree	Myrtaceae	Poijam	Diabetes	One teaspoon of bark powder along with water is taken to control diabetes.	(Rout *et al*.2009)
Tamarindus indica L.	Tree	Fabaceae	Tentuli	Diarrhea	Not Reported Not Reported	(Rout & Panda 2010) (Kar *et al*.2013)
Terminalia alata B. Heyne ex Roth	Tree	Combretaceae	Sahaju	Chest pain	To treat chest pain, the stem bark is cooked, and the infusion is consumed orally.	(Rout *et al*.2009)
Terminalia arjuna (Roxb. ex-DC.) Wight & Arn.	Tree	Combretaceae	Arjuna	Malaria, Asthma, Bowel issues, wounds infection and Malaria	Twenty grams of stem bark decoction are used once daily for five days straight prior to meals in order to treat malaria. To treat asthma, *Justicia adhatoda* and *Helicteres isora* leaf juice are combined with stem bark powder and administered twice daily for a week. Not Reported Tight and blocked bowels are treated with concentrated bark juice. On wounds and infections, bark decoction is administered topically. Taking the decoction of stem bark orally is useful in treating malaria.	(Behera 2006) (Rout *et al*.2012) (Kar *et al*.2013) (Sinha *et al*.2021) (Sinha et al.2021) (Behera *et al*.2025)
Terminalia bellirica (Gaertn.) Roxb.	Tree	Combretaceae	Bahada	Leucoderma, Dysentery.	To treat leucoderma in women, two grams of stem bark paste and boiling	(Behera 2006)

					water are administered twice a day for ten days following meal consumption. Not Reported To treat dysentery, the bark paste is steeped in water overnight and administered in the morning.	 (Kar *et al*.2013) (Rout & Panda 2017)
Terminalia chebula Retz.	Tree	Combretaceae	Harida	Stomach pain, Diarrhea and Dysentery.	Not Reported Not Reported	(Rout & Panda 2010) (Kar *et al*.2013)
Terminalia elliptica Willd.	Tree	Combretaceae	Sahaju	Diarrhea	Not Reported	(Dimri *et al*.2021)
Terminalia phillyreifolia (Van Heurck & Mull.Arg.) Gere &Boatwr.	Tree	Combretaceae	Phasi	Diarrhea and Dysentery	Not Reported	(Dimri *et al.*2021)
Tinospora cordifolia (Willd.) Hook.f. & Thomson	Climbing shrub	Menispermaceae	Guluchi	Diarrhea, Malaria Vomiting, Cough.	Not Reported To manage high blood sugar, stem bark juice is administered on an empty stomach.	(Kar *et al*.2013) (Sinha *et al*.2021)
Ventilago madraspatana Gaertn.	Liana	Rhamnaceae	Rakta pichula	Snake bite, Shattered Bone, Gout.	The infusion of bark boiled in water for 2 hours is given in snake bite. The afflicted area is covered with the bark paste to treat shattered bone. Not Reported	(Rout *et al*.2009) (Panda *et al*.2011) (Panda *et al*.2017)
Ventilago calyculata Tul.	Climbing shrub or Liana	Rhamnaceae		Malaria	Stem bark juice is useful in malaria which is taken orally.	(Behera *et al*.2025)
Ventilago denticulata Willd.	Tree	Rhamnaceae	Kantamali	Gynecological disorder	The stem bark decoction is used in fixing gynecological disorder.	(Rout *et al*.2012)
Vitex leucoxylon L. f	Tree	Lamiaceae	Chadheigudi	Malaria	Bark decoction is taken in case of malaria fever.	(Behera *et al*.2025)
Vitex negundo L.	Tree	Lamiaceae	Begunia	Typhoid fever	Typhoid fever is treated by taking 15 ml of root bark decoction and 21 black peppers paste twice a day for seven days.	(Behera 2006)
*Wrightia antidysenterica (*L.) R. Br	Herb	Apocynaceae	Kuruma	Gastro intestinal disorder	Not Reported	(Dimri *et al*.2021)
Wrightia tinctoria (Roxb.) R.Br.	Tree	Apocynaceae	Pita korua	Diarrhea	Not Reported	(Kar *et al*.2013)

Zingiber officinale Roscoe	Herb	Zingiberaceae	Ada	Eye problem	Stem bark decoction is used.	(Behera 2019)
Ziziphus mauritiana Lam.	Small Tree	Rhamnaceae	Bara koli	Stomachache during pregnancy	In Stomachache, the pregnant women are given the bark paste for treatment. After eating, pregnant women are given a paste made from stem bark to relieve their stomachache.	(Behera 2006) (Parida 2019)
Ziziphus oenopolia (L.) Mill.	Climbing shrub	Rhamnaceae	Kanteikoli /Kana koli	Dysentery	Three millimeters of stem bark decoction and two grams of long pepper paste are administered in the morning on an empty stomach to treat dysentery.	(Behera 2006)
Ziziphus rugosa Lam.	Scrambling shrub	Rhamnaceae	Chuna koli	Hysteria	The stem bark decoction along with long pepper and ginger paste is taken to cure hysteria treatment.	(Panda *et al*.2011)

Diversity and distribution of ethnomedicinal plants

Here in this review research, a total of 110 EMPs belonging to SBR and its fringes area were included whose bark is used as ethno-medicine to treat different common diseases. The enumerated 110 plants have been distributed under 44 families and 76 genera. Among the 44 families reported in this current review, Fabaceae has highest number of plant species whose bark are used as ethno-medicine i.e.,12 (10.9 %)which is followed by Moraceae, Combretaceae and Rubiaceae (7 plant species each contributing 6.4%), Caesalpiniaceae and Rhamnaceae (6 plant species contributing 5.5%), Malvaceae and Apocynaceae(5 plant species contributing 4.5%), Anacardiaceae(4 plant species contributing 3.6%), Lamiaceae , Myrtaceae, Annonaceae and Euphorbiaceae(3 plant species each contributing 2.7%), Lauraceae, Ebenaceae, Dilleniaceae, Mimosaceae, Meliaceae, Sapotaceae, Bignoniaceae and Lythraceae (2 plant species each contributing 1.8%). The data visualization of family wise distribution of plant species was shown in figure 3. which was performed using RAW Graph. The chart included the families those have at least two EMPs. The genus *Terminalia* represented highest number of medicinal plant species (6 plant species, 8%) followed by *Bauhinia* and *Ficus* (4 plant species each, 5.3%) while *Acacia*, *Pterospermum* and *Ventilago* (3 plant species each, 3.9%). The genus wise distribution of plant species is shown in figure 3. The *Terminalia* genus is seen to be used widely in Ayurveda, traditional medicine of China and traditional medicine of Africa (Cock 2015). The *Terminalia* genus is known to have a wide range of therapeutic applications i.e., Cardio protectivity, anti-oxidant activity, anti-cancerous, antimicrobial, antidiabetic and gastro protective (Kumar *et al*. 2023).

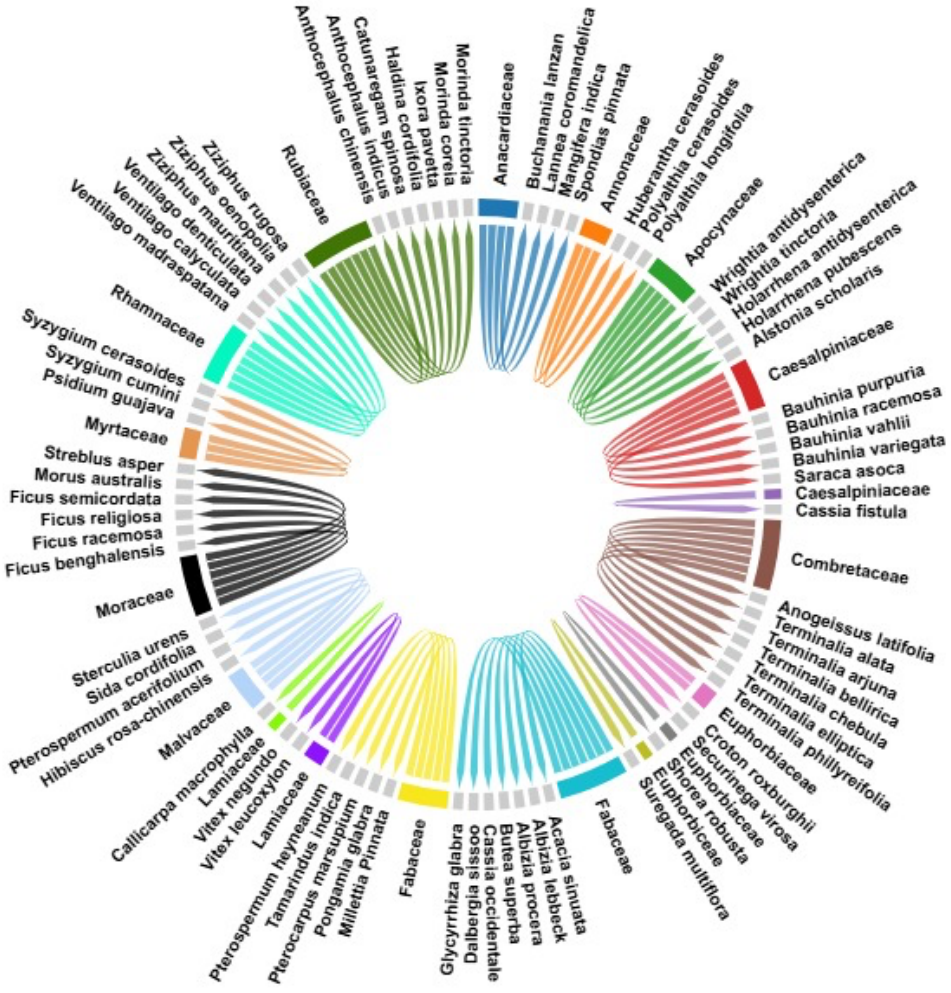

Figure 3. Chord diagram showing distribution of species among different families.

Ethnomedicinal use of barks of different plants of SBR

According to current literature survey, a total of 61 diseases is mentioned in table 1. The diseases reported in this review work by different authors are broadly categorized into 10 classes (disease which have at least 5 plants used for the treatment). The categories included in the graph are Table 1 lists a total of sixty-one disorders based on the current literature review. The illnesses described by various authors in this review work can be broadly divided into ten types. The most

mentioned disease category is gastrointestinal disorder. Gastrointestinal disorder includes diseases like vomiting, stomach pain, bowel issues, and colic, clogging issues, indigestion, dysentery and diarrhea. The literature report illustrates 75 plant species (68.18%) are used to treat different gastrointestinal disorders mentioned above. This review also showed that a total of 36 plants alone is mentioned by different authors in the treatment of dysentery, followed by diarrhea (25), skin (16 plant species, 14.8%), gynecological disorders (13 plant species,11.8%), malaria (12 plant species,10.9%), Musculoskeletal disorder (8 plant species, 7.3%), diabetes (8 plant species,7.3%), respiratory disease which includes cold, cough, sore throat, asthma (6 plant species, 5.5%) and animal bite (5 plant species, 4.5%).

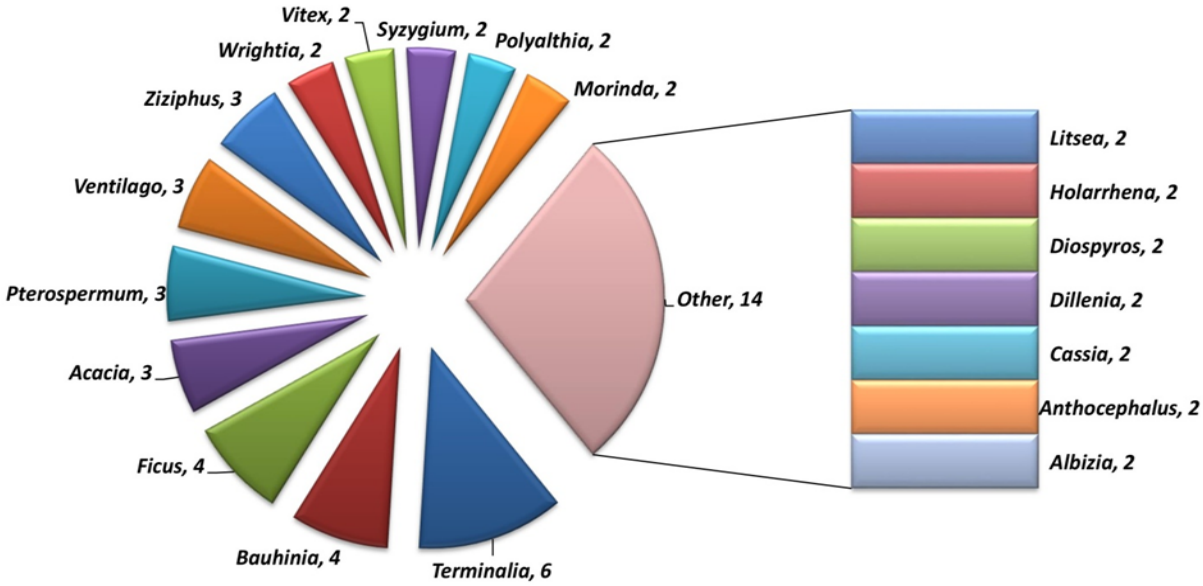

Figure 4. Genus wise distribution of medicinal plants

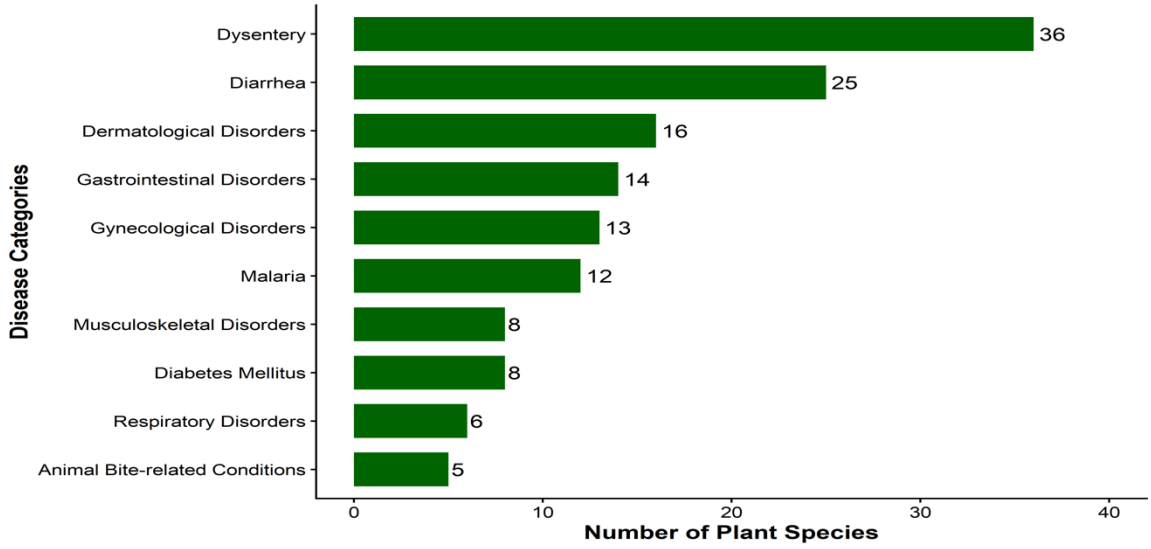

Figure 5. Bar Graph showing Number of Plants used in different disease category

Habit of ethnomedicinal plants

Out of 110 documented ethnomedicinal plants tree is the dominant growth form which accounts for 70 % (77 plant species) followed by shrub having 25.5% (28 plant species) of the total recorded ethnomedicinal plants. So here the distribution indicates that trees are the main source of traditional medicinal barks. In contrast, the combined contribution of both herbs and lianas is less than 5 % (8 plant species). The above distribution highlights that woody plant species particularly the tree species are the primary source of bark for preparation of ethnomedicine by local traditional healers. Here the shrub

distribution includes climbing shrub, subshrub, undershrub, large shrub and scrambling shrub. The phytochemical rich ethnomedicinal plants contain terpenes, alkaloids, flavonoids, sterols, saponins, catechins, and other biochemical chemicals in medicinal barks and have a variety of therapeutic uses, including antibacterial, anti-diabetic, and cardiotonic effects (Sadgrove *et al*. 2025). The Figure 6. shows growth habit profile of ethnomedicinal plant species recorded from the forest fringe villages of the Similipal Biosphere Reserve, Odisha, India. The values are expressed as both species count and percentage in the figure.

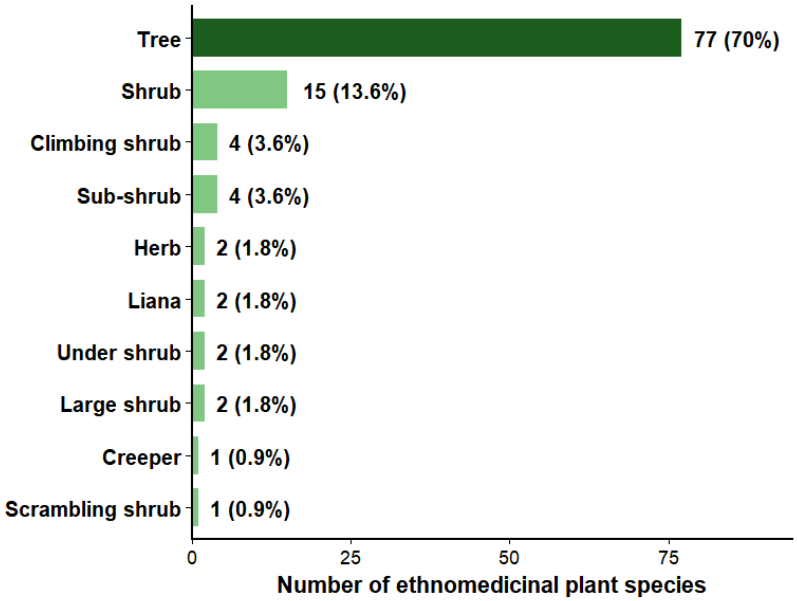

Figure 6. Distribution of different growth habits of recorded EMPs from SBR and its adjoining area.

Parts used in preparation of ethno-medicine

Tree bark is considered as potential source of biologically active compounds like phenols, tannins, and alkaloids etc. which are synthesized in sub-epidermal part of tree. These potential secondary metabolites have several biological properties like antimicrobial, antioxidant activity, biodegradability, UV-shielding activity for which barks are used in several diseases like diabetes, cancer and inflammation (Jain *et al*. 2025).

As this review work aimed for writings on use of bark as ethno-medicine of SBR prepared by the local herbalists, the literatures included in the study contains both use of stem and root bark. Among the total 110 recorded ethnomedicinal plants species, utilization of stem bark in ethnomedicine was dominant accounting for 100 plant species (90.9%) while the use of root bark was reported for only 10 plants (9.1%). These findings indicate the significant role of stem bark as an important ingredient in the preparation of traditional plant-based medicine by the local ethnic groups of the SBR.

Preparation methods

The mode of preparation techniques employed by traditional healers for the treatment of various diseases by using both stem bark and root bark were systematically compiled from the recorded literature. This review documented six categories of ethno-medicine preparation techniques from root or stem bark which includes fresh paste, decoction, juice, powder, infusion, and extraction. Among the recorded ethnomedicinal preparation methods most common preparation method for stem bark is fresh paste (31) which is followed by decoction (25), juice (22), powder (15), infusion (4), and extraction (3). In contrast, the root bark was used predominantly by decoction method (4) followed by fresh paste (3), powder (2) and infusion (1). Figure depicts the ethnomedicinal preparation methods by using both stem and root bark from different medicinal plant species recorded in the reviewed literature.

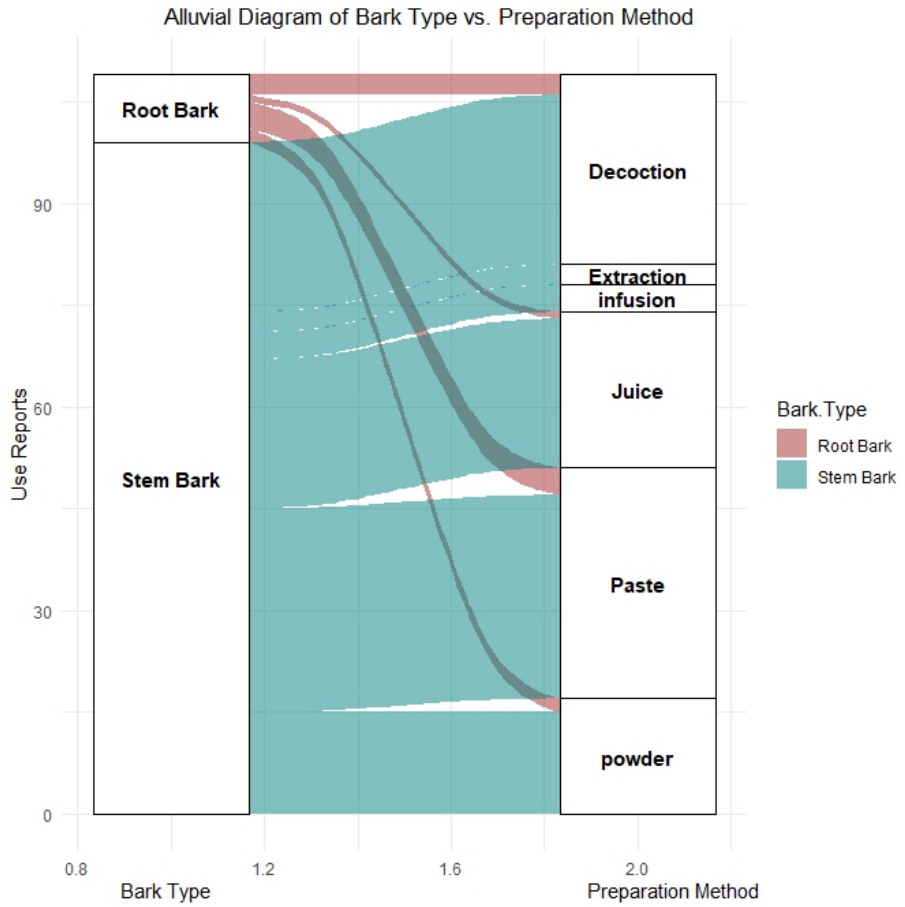

Figure 7. Alluvial diagram showing different modes of preparation of ethnomedicine from both Stem bark and Root bark.

Publication Trends

In present review a total 31 articles were studied for extraction of ethnomedicinal data on bark as the source of traditional medicine used by local indigenous communities residing inside the forest fringe area of SBR. The detailed year wise publication trend is given in the figure 8 for detail clarification. Among the total 31 articles, 10 were published in only Scopus index journals, 5 articles in both Scopus and WoS journals, 1 article in T&F and rest were published in peer review journal.

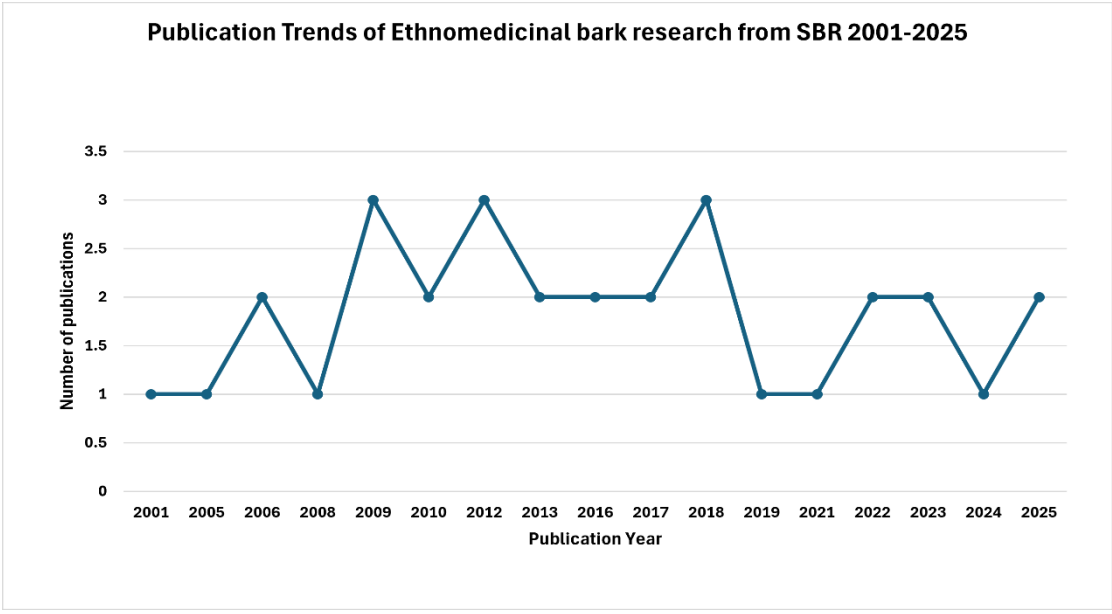

Figure 8. Graph representing Publication trends from 2001-2025 on Ethnomedicinal studies with respect to SBR.

Discussion

Reflecting a considerable medicinal plant diversity, the 110 plants that were enumerated in the present review belong to 44 families and 76 genera. The Fabaceae shows its dominance clearly with 12 species(10.90%) which is consistent with other ethnobotanical studies from Western Ghat (Yogeesha *et al.*2026), south Eastern Ghat (Devi *et al*.2026), Eastern Ghat (Silambarasan & Ayyanar 2015) and Central India Chhattisgarh (Dubey *et al.*2025).The repeated dominance of Fabaceae family indicates its ethnomedicinal richness and cultural significance in across different geographical regions of India like Eastern Ghats, Western Ghats and Central India.

The preponderance of Fabaceae has also been reported from Bangladesh's Bilaichari Upazilla, Rangamati District in a study on qualitative and quantitative ethnobotanical study of the Pangkhua community (Faruque *et al.*2019). This highlights the South Asian ethnomedicinal reliance on Fabaceae, underscoring the ethnopharmacological importance and traditional relevance in South Asian context.

Notably, this pattern shows inconsistence in Trans-Himalayan region (Ladakh) India, where the dominant family is Asteraceae (Batool *et al.*2023). A similar pattern is observed in and around Dirre Sheikh Hussein heritage region of South-eastern Ethiopia, where the leading family is Asteraceae (Demie *et al.*2018). Such contrasts in family dominance between SBR and trans-Himalayan or East African context may be due to different altitude, climatic condition, ecological factors, difference in cultural preferences and species composition, which contribute collectively to the ethnomedicinal flora of each region.

Within the recorded 76 genera in the present review, *Terminalia* emerged as dominant genus representing approximately 8% of the total genera This distribution of genera highlights the taxonomic prominence of the *Terminalia* genus in the medicinal flora of SBR and its significant ethnomedicinal role in the region. Its ethnomedicinal value is amplified by six species (*T. alata, T. arjuna, T. bellirica, T. chebula, T. elliptica and T. phillyreifolia*) having various therapeutic uses.

The salience of *Terminalia* genus in SBR contrasts with lower prevalence in other regional ethnobotanical studies (Yogeesha *et al.* 2026, Devi *et al*.2025, Halder *et al*.2021). This variance reinforces both the regional variation in species availability and the differential emphasis of local healers and researchers on particular *Terminalia* taxa.

Numerous medicinal uses for the *Terminalia* genus have been documented, including cardio protectivity, antioxidant activity, anti-cancerous, antibacterial, antidiabetic, and gastroprotective properties. *T. arjuna* has been used in 4 different diseases which includes bowel issues, asthma, malaria, diarrhea and dysentery.

Out of 110 ethnomedicinal plants recorded in the present review, the gastrointestinal disorder alone is treated by 75 plant species (68.18%) followed by dermatological disorder, Gynecological disorders, Malaria, Musculoskeletal disorders, Diabetes mellitus, Respiratory disorders and Animal-bite related conditions. These findings highlight that the ethnomedicinal knowledge of the study region which is distinguished in managing the gastrointestinal disorder with medicinal plant species used widely for treating ailments like skin disorder, gynecological problems, malaria, respiratory diseases and musculoskeletal disorder.

Among the 110 recorded medicinal plants recorded, *Holarrhena pubescens* emerged as the most cited ethnomedicinal plant which have been reported independently by 9 authors in their ethnomedicinal studies of SBR and its fringe areas. It is widely used in treating common ailments which includes dysentery, malaria, piles, snake bite and other gastrointestinal diseases, which underscores its significant role in traditional health care practices by different ethnic groups of SBR.

The growth form analysis showed tree as the leading class contributing 70% (77 plant species) of the total recorded ethnomedicinal plant. The maximum use of tree species in ethnomedicine preparation is consistent with the findings of several ethnobotanical studies. For example, tree accounted for 39.3% of the total recorded medicinal plants in North Bengal (Raj *et al.*2019) while in deciduous forest of Chhattisgarh, tree constituted for 48% of the studied medicinal flora (Kala 2009) The dominance of tree species in ethnomedicinal flora of SBR indicates the ecological availability and reflects the reliance on bark use, underscoring the pharmacological significance for the local traditional healers.

The use of different plant parts in the preparation of ethnomedicine varies noticeably across different ethnobotanical studies and geographical region. In Several ethnobotanical studies carried out in different regions of Odisha, where root is the leading used plant part while use of bark is less prominent (Halder *et al*.2021, Basuri *et al*.2024). In contrast, a study from

Western Ghats described leaf as the frequently used plant parts (Yogeesha *et al.*2026). While In a Trans-Himalayan ethnobotanical study, the use of bark is not mentioned at all (Batool *et al.*2023). Some international studies reported leaf as the most used plant part in ethnomedicine in their investigation followed by other parts (Mittra *et al.*2026, Matlala *et al*.2026 & Choudhary *et al*.2025). These findings demonstrate that use of bark vary considerably among the different ethnic groups and in different study regions across the globe. So, the present review prominently documented the bark use which reflects the unique characteristic reliance on bark remedies by the local communities of forest fringe areas.

The remedial role of bark may be associated with its unique phytochemical composition, biological and ecological functions. Bark performs as protective tissue in woody plant and contains diverse bioactive compounds including phenolic compounds, alkaloids, tannin, flavonoids and terpenoids. These secondary metabolites act as anti-oxidant, anti-microbial, anti-inflammatory and other bioactivities (Tanase *et al.* 2019, Supriyadi *et al.* 2025).

Bark's unique phytochemical profile and cultural significance are highlighted by its very widespread use in the Similipal Biosphere Reserve. This review positions bark as a frontier for ethnopharmacological research and sustainable drug discovery by highlighting a neglected yet therapeutically significant plant element.

The study also showed that stem bark is used more frequently than root bark. The preference for stem bark over root bark may be due to its ability to prevent plant damage or death. Such activities may reflect indigenous ecological knowledge and resource management strategies that local populations have amassed over many generations.

In order to guarantee the long-term availability of priceless medicinal resources, documentation of traditional bark use should be complemented by conservation awareness and sustainable harvesting techniques.

Overall, the review highlights the ethnopharmacological value of traditional bark-based medicines as well as the need for additional phytochemical, pharmacological, and conservation-focused research. The development of new pharmaceutical compounds may benefit from scientific confirmation of traditional bark-based remedies, in addition to supporting the conservation of biodiversity and the preservation of indigenous knowledge systems.

Conclusion

The current review study focuses on the traditional medicinal use of 110 plants whose bark has occasionally been cited by various authors. The local ethnic groups employ every plant listed here to treat a variety of common illnesses, including gastrointestinal disorders, gynecological concerns, diabetes, skin problems, animal bites, malaria, and health conditions including fever, cold, and cough. Because many nations, including China, India, Africa, and the Middle East, rely on herbal medicine, WHO also encourages research on traditional medicine. The availability of a variety of therapeutic plants and the ethno-botanical expertise of the locals are the reasons behind the increased use of traditional medicine. The SBR and its surrounding region are home to numerous ethnic groups, including the Santals, Kohl, Ho, Sabar, Khadia, and Bathudi, as well as a wide variety of medicinal plants. For future application, the indigenous knowledge of the local communities about plant-based medicine must be thoroughly investigated. In order for traditional knowledge to be passed down to future generations and made available to the scientific community for additional investigation of this forest richness, it must be recorded and communicated in a methodical manner. The bioprospection of the plants and the biodiscovery of noble plant-based medications, which may be a helpful substitute for traditional antibiotics, would be aided by this record of EMPs. Conventional antibiotics are now resistant, and by 2050, AMR is predicted to cause 1.91 million deaths annually. Therefore, AMR poses a major threat to the global health system, especially to nations with lower and moderate incomes. Thus, biodiversity reaches areas such as SBR, where local residents' traditional knowledge serves as the basis for alternative drug research.

Declarations

List of abbreviations

SBR - Similipal Biosphere Reserve, EMPs - Ethnomedicinal plants

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