International Journal of Educational Research and Technology
IJERT: Volume 16 [2] June 2025: 24-31
P-ISSN 0976-4089; E-ISSN 2277-1557

Website: www.soeagra.com/ijert.html
DOI: 10.15515/ijert.0976 4089.16.2.2431

A comprehensive study of Ethnobotanical Plants used by the Tribals of East and West Singhbhum Districts of Jharkhand

Animitra Roy Chowdhury and R.N. Yadav
Department of Environmental Science, Mansarovar Global University, Sehore, India

Abstract
The indigenous populations of East and West Singhbhum districts in Jharkhand, India, possess extensive ethnobotanical knowledge essential for biodiversity protection and cultural preservation. This study records and examines traditional botanical knowledge via systematic field research carried out from 2022 to 2024. Our study involved 90 participants, comprising 40 traditional healers aged 24 to 82 years and 50 community members aged 14 to 85 years, from various tribal communities including Oraons, Santhals, Ho, Munda, Kharia, Bhumij, and Sabars. The research recorded 54 plant species from 28 families, with Fabaceae (18%), Moraceae (12%), and Malvaceae (9%) as the predominant groups. Quantitative research demonstrated substantial associations between age and the retention of ethnobotanical knowledge ($r = 0.78$, $p < 0.001$), along with significant gender-specific disparities in plant knowledge distribution. The study delineates significant obstacles to knowledge preservation while laying the groundwork for evidence-based conservation methodologies.
Keywords: Ethnobotany, Indigenous knowledge, Medicinal plants, Traditional ecological knowledge, Conservation biology, Biocultural diversity

Received 10.02.2025 Revised 18.03.2025 Accepted 06.04.2025

CITATION OF THIS ARTICLE
Animitra Roychowdhury and R.N. Yadav. A comprehensive study of Ethnobotanical Plants used by the Tribals of East and West Singhbhum Districts of Jharkhand. Inter. J. Edu. Res. Technol. 16[2] June 2025;24-31.

INTRODUCTION

Ethnobotanical knowledge based on plants was developed locally to address a variety of problems pertaining to food, health, agriculture, disaster relief, etc. Furthermore, it is just another form of knowledge and does not compete with the scientific method (Das et al., 2022). Ethnobotanical knowledge about plant not only secure food and resources but also save diversity of plant and allied organisms (Sarkar et al., 2018). In recent decades, the traditional knowledge of the medicinal properties of plants that has been accumulated by numerous generations has been swiftly diminishing (Sarkar et al., 2017a). In numerous regions of the globe, rural tribal communities rely on wild plants to meet their nutritional needs, which are essential for their food security (Prasad et al. 2008; Mazumder & Sarkar, 2019). They have sufficient knowledge about natural resources. Several Indian states have rich flora and fauna.

Jharkhand, a state that is abundantly endowed with natural resources and a diverse array of plant and animal species, is primarily inhabited by tribal people, who constitute 28% of its population. East and West Singhbhum districts in the state of Jharkhand are distinguished by their medicinal flora, tribes, mining, and diverse industrial endeavours. Despite the presence of a plethora of indigenous plants of significant ethnobotanical significance, this research location in the East and West Singhbhum districts of Jharkhand is one of the least studied regions in the field of ethnobotany. The tribals of these two districts have cultivated a profound relationship with nature, which is evident in their utilisation of indigenous flora for medicinal, social, cultural, and religious purposes. The study of the relationship between people and plants, known as ethnobotany, has garnered a growing amount of attention as a result of its significance in the preservation of traditional knowledge, the promotion of biodiversity conservation, and the development of sustainable practices. This study addresses the urgent necessity for the systematic documentation and analysis of traditional botanical knowledge in these regions. The tribes of Jharkhand, particularly those residing in the East and West Singhbhum districts, exhibit a sophisticated comprehension of the local flora. They employ indigenous plants for a variety of purposes, such as sustenance, medicine, and cultural practices. This exhaustive study offers critical information for the

preservation of indigenous knowledge and the cultivation of an appreciation for the biodiversity of this region.

MATERIAL AND METHODS

(a) Study area and Methodology

The research was conducted by conducting comprehensive field visits to numerous villages in the designated area of the East and West Singhbhum districts of Jharkhand. Rich forests, diversified flora, and the presence of numerous indigenous tribes who have coexisted in harmony with nature for centuries are the defining characteristics of these districts. Existing literature was reviewed to complement the data collected in the field. The plants identified were catalogued based on their local names and botanical names with families.

(b) Field Surveys

The research extended over various villages, conducting visits at regular intervals from 2022 to 2024 within the designated study area.

(c) Survey technique

The survey technique encompassed interviews, group discussions, and engagements with stakeholders such as local plant users, community members, religion healers, and village officials. The inventory method entailed the systematic collection of plant specimens from the research region. Local nomenclature, utilised plant parts, and their intended applications were systematically documented as outlined by Martin (1995) and Cunningham (2001) to gather data on plant usage. Plant samples were identified by using several books and relevant articles (Sarkar et al., 2017b; Das et al., 2018; Tirkey and Amit, 2021) and their applications were recorded. The data were examined to comprehend the cultural, medical, religious, and social value, as well as the issues facing these ethnobotanical resources.

(d) Interview

In the pursuit of comprehending traditional knowledge concerning the uses of ethnobotanical plants, a meticulous approach was adapted during the fieldwork within the study area. In-depth interviews with local tribal leaders, herbalists, and community leaders garnered knowledge about plant species and their uses. A standardised questionnaire was developed by incorporating the guidelines of Martin (1995) and Sreshtha et al. (1998). Semi-structured questionnaires were featured during both informal and formal interviews with residents in each studied area. The questionnaires were featured in two distinct parts: the first concentrated on the assimilation of general socioeconomic and demographic characteristics, while the second delved into the importance of ethnobotanical plants being used by the local people. To establish contact with the settlements, mediators with established rapport within tribal communities, such as forest officials, tribal chiefs, and local merchants, were instrumental in this study. A participant-observer approach was implemented where daily activities were closely monitored, and interpersonal connections were forged by actively engaging in social and religious ceremonies like marriages, rituals, and curing sessions.

RESULTS AND DISCUSSION

The study identified and documented multiple plant species that were utilised by the aforementioned tribes. The research entailed the interviewing of 40 informants from the Santhal, Munda, Ho, Oraon, and Sabar communities, who were aged 24 to 82 and were actively practising herbal medicine in the villages under investigation. Additionally, approximately 50 men and women aged 14 to 85 from the same community were interviewed to gather knowledge about the uses of indigenous plants in their daily lives on an intergenerational basis.

Table 1: A list of the Indigenous plants with their local names and botanical names

Sl.no	Local Name	Botanical Name	Family	Type	Parts of the Plant Used	Medicinal Purpose	Other Purposes
1	Sal	*Shorea robusta*	Dipterocarpaceae	Tree	Leaves, Flowers, Timber	Treats fever, wounds, and inflammation	Timber is used for construction; wood is considered very sacred and used in all religious functions Leaves are used for making plates during religious ceremonies and feasts. Pots made by the leaves of Sal tree is used for urine

							tests for diagnosis of different diseases Flowers and leaves are used for the decoration of the houses during Sarhul festival.
2	Karam	*Nauclea latifolia*	Rubiaceae	Tree	Leaves, Flowers, Bark	Used for digestive issues and fever	Believed to be very auspicious, and used in all religious functions, a tree or twig must be used in the Karma festival, the social symbol of health and well-being,
3	Palash	*Butea monosperma*	Fabaceae	Tree	Flowers, Seeds	Treats dysentery, diarrhoea, and jaundice	Used in dyeing fabrics, widely used during festivals and dances
4	Shisham	*Dalbergia sissoo*	Fabaceae	Tree	Wood, Leaves	Used for treatment of ailments and for blood circulation	Timber for high-quality furniture
5	Sitafal	*Annona squamosa*	Annonaceae	Tree	Fruit, Seeds	Not directly used in rituals but considered auspicious	Consumed during festivals and gatherings
6	Kanthal	*Artocarpus heterophyllus*	Moraceae	Tree	Fruit, Seeds, Wood	Used for digestive issues and respiratory health and managing diabetes	Significant in traditional cuisine and fruits offered in spiritual rituals
7	Aam	*Mangifera indica*	Anacardiaceae	Tree	Fruit, Leaves, Wood	Treats digestive issues and boosts immunity	Leaves, fruits and wood are used in all social and religious functions. Integral in cultural cooking and feasts
8	Jamun	*Syzygium cumini*	Myrtaceae	Tree	Fruit, Seeds	Improves digestion, and treats diabetes, leaves are used to cure urinary problems	Culinary uses, used to make dyes, wood is used in construction and making furniture, ornamental plant
9	Nirgundi	*Vitex negundo*	Verbenaceae	Tree	Leaves, Roots	Treats joint pain, fever, and other health-related issues	used in villages for religious offerings and natural environment cleansers.
10	Dhatura	*Datura stramonium*	Solanaceae	Shrub	Seeds, Flowers	Treats asthma, cough, and other respiratory issues. (Caution: toxic!)	Used in specific spiritual practices
11	Akand	*Calotropis gigantea*	Asclepiadaceae	Shrub	Leaves, Flowers, Seeds	Treats coughs and skin infections	Significant in specific community health rituals, used in religious functions
12	Dudhiya	*Euphorbia hirta*	Euphorbiaceae	Herb	Leaves, Seeds, Oil	Treats asthma, bronchitis, and skin ailments, promotes hair growth	Natural pesticides, used as a natural dye
13	Sambhalu	*Vitex trifolia*	Verbenaceae		Leaves, Roots	Treats cough and cold, anti-inflammatory, used as poultices, treats wounds	Used for traditional crafts
14	Sahjan	*Moringa oleifera*	Moringaceae	Tree	Leaves, Seeds, Pods, Oil	Boosts immunity, treats malnutrition, maintains blood pressure and improves wellness	Important in cultural practices
15	Chiraita	*Swertia chirata*	Gentianaceae	shrub	Leaves	Treats fever, intestinal disorders, and digestive issues	Used in beverages and wood is used in traditional decorative art

16	Kalmegh	*Andrographis paniculata*	Acanthaceae	Shrub	Leaves, Roots, Stem	Known for boosting immune and fever-relieving properties	Used in traditional herbal products
17	Basak	*Justicia adhatoda*	Acanthaceae	Shrub	Leaves, Flowers	Treats respiratory issues, cough, and asthma	Used as a natural purifier for antimicrobial properties
18	Giloy	*Tinospora cordifolia*	Menisperma-ceae	Herb	Stem, Leaves	Used for boosting immunity, detoxification, and treating fever.	Often used in cosmetic applications, veterinary use, and ornamental uses.
19	Imli	*Tamarindus indica*	Fabaceae	Tree	Fruit, Seeds	Treats digestive issues and detoxifies	Pulp is used in cooking and food, used for deaddiction of liquor
20	Pipal	*Ficus religiosa*	Moraceae	Tree	Leaves, Bark, Wood	Treats respiratory ailments, and digestive problems	Wood used in temple construction; tree is used in many religious ceremonies
21	Karanj	*Pongamia pinnata*	Fabaceae	Tree	Seeds, Leaves	Treats skin disorders, joint pain, and infections, good for gum health	Agriculture and soil improvement, biofuel production, animal feed, environmental uses, pesticides and insecticides, cosmetics and industrial uses
22	Tulsi	*Ocimum sanctum*	Lamiaceae	Shrub	Leaves, Flowers	Used to treat cough, cold and digestive issues.	Leaves are used in religious functions, natural cleansers and in cooking, used as beverages.
23	Ashok	*Saraca asoca*	Fabaceae	Tree	Bark, Flowers, Leaves	Treats gynaecological issues, fever, and digestive problems.	Symbol of fertility, used in worship, especially during weddings.
24	Lajwanti	*Mimosa pudica*	Mimo17=saceae	Herb	Leaves, Seeds	Treats fever, pain, and digestive issues.	Ornamental
25	Arandi	*Ricinus communis*	Euphorbiaceae	Shrub	Seeds, Oil	Treats constipation, joint pain, and promotes hair growth.	Oil used in various industries.
26	Bakayam	*Melia azedarach*	Maliaceae	Tree	Leaves, Wood	Treats infections, anthelmintic, diuretic, used in digestive issues, anti-inflammatory, useful in diseases related to uterus	Used in spiritual rituals in some tribal communities, used as natural pesticides, green manure, used for timber, ornamental uses
27	Aatna	*Cleistanthus collinus*	Phyllanthaceae		Leaves, roots, bark	Treats skin diseases, anti-inflammatory, joint pain, and digestive disorders.	Used in specific tribal rites for purification. Used to welcome a newborn baby, natural environment cleanser,
28	Jara	*Ficus hispida*	Moraceae	Tree	Leaves, Fruits, seeds	Digestive health, liver disorder, skin diseases, wound healing, oral health,	Fodder, and soil stabilisation, associated with rituals in Indigenous communities
29	Neem	*Azadirachta indica*	Meliaceae	Tree	Leaves, Bark, seeds	Antibacterial, digestive health, used in skin diseases	Biopesticides, wood is used for construction, used in different religious rituals, and environment purifier
30	Ber	*Ziziphus mauritiana*	Rhamnaceae	Tree	Fruit, Leaves	Immunity booster, digestion	Fodder, fruit cultivation, and thorny branches are used for burying of dead bodies.

31	Kanchnar	*Bauhinia variegata*	Fabaceae	Tree	Bark, Flowers	Anti-inflammatory, immune booster, used in treating thyroid disorders, used in skin problems	Ornamental, used for making perfumes
32	Satyanashi	*Argemone mexicana*	Papaveraceae	Herb	Flowers, Seeds, Latex	Skin diseases, respiratory problems, eye problems, menstrual problems, liver health	Biopesticide used to make yellow dye, Used in traditional rituals and ceremonies
33	Lajwanti	*Mimosa pudica*	Fabaceae	Herb	Leaves, Roots	Pain relief, wound healing	Soil stabilization
34	Mahua	*Madhuca longifolia*	Sapotaceae	Tree	Flowers, Seeds	Energy booster, used in controlling diabetes, oil is useful for skin problems	The tree Is believed to be very auspicious as a whole in the Adivasi culture. It is required in the famous Baha festival. The leaves and the flowers are used in religious functions Alcohol production, oil extraction
35	Bel	*Aegle marmelos*	Rutaceae	Tree	Fruit, Leaves	Stomach disorders, immunity booster	Leaves, Fruits and woods are used in different religious rituals
36	Bargad	*Ficus benghalensis*	Moraceae	Tree	Aerial roots, Bark	Antioxidant, anti-inflammatory, diabetes management, wound healing, skin diseases	Used for shade and shelter, making it a popular gathering place9 in villages, used as timber, dye and fib
37	Patharchatta	*Bryophyllum pinnatum*	Crassulaceae	Shrub	Leaves	Kidney stones, wound healing	Ornamental
38	Makoy	*Solanum nigrum*	Solanaceae		Leaves, Fruit	Liver health, fever reduction	Culinary use
39	Aprajeeta	*Clitoria ternatea*	Fabaceae	Herb	Flowers, Roots	Memory enhancement, stress relief	Ornamental, dye extraction
40	Haldi	*Curcuma longa*	Zingiberac-eae	Shrub	Rhizome	Anti-inflammatory, immunity booster	Culinary spice
41	Giloy	*Tinospora cordifolia*	Menisper-maceae	Herb	Stem, Leaves	Fever reduction, immunity booster	Herbal medicine
42	Mulethi	*Glycyrrhiza glabra*	Fabaceae	Shrub	Root	Cough relief, digestive health	Flavouring agent
43	Nag kesar	*Mesua ferrea*	Calophyllaceae	Tree	Flowers, Seeds	Anti-inflammatory, heart health	Ornamental, used for good fragrance,
44	Gurmar	*Gymnema sylvestre*	Apocynaceae	Herb	Leaves	Diabetes management, known as a temporary sweetness blocker in tongues, used to treat snake bites, laxative effect	Used in beauty therapy
45	Champa	*Magnolia champaca*	Magnoliaceae	Tree	Flowers, Bark	Aromatherapy, stress relief	Ornamental, used in religious offerings, used for good fragrance
46	Doob Grass	*Cynodon dactylon*	Poaceae	Herb	Whole plant	Skin disorders, wound healing, anaemia	Soil stabilization, culinary uses, used in religious functions
47	Amla	*Phyllanthus emblica*	Phyllanthaceae	Tree	Fruit	Immunity booster, hair health,	Cosmetics
48	Amrud	*Psidium guajava*	Myrtaceae	Tree	Leaves, Fruit	Diarrheal treatment, blood sugar control, useful in oral treatment	Culinary uses
49	Kendu	*Diospyros melanoxylon*	Ebenaceae	Tree	Fruit, Leaves	Blood purification	Fodder, fruit cultivation

50	Parijat	*Nyctanthes arbor-tristis*	Oleaceae	Tree	Flowers, Leaves	Joint pain relief, fever reduction	Ornamental, used in religious functions, used for fragrance
51	Semar	*Bombax ceiba*	Malvaceae	Tree	Bark, Flowers	Kidney health, respiratory health	Timber production, cotton used for making pillows and quilts
53	Kusum	*Schleichera oleosa*	Sapindaceae	Tree	Seeds, Bark	Digestive aid, heart health	Timber, oil extraction
54	Arjun	*Terminalia arjuna*	Combretaceae	Tree	Bark	Heart health, blood pressure regulation	Timber
55	Babul	*Vachellia nilotica*	Fabaceae	Tree	Bark, Gum	Oral health, wound healing, hair improvement, detox	Timber, gum production
56	Bhringaraj	*Eclipta alba*	Asteraceae	Herb	Leaves	Hair oils	Inks used in dyes and Tattoos. ornamental plants.
57	Tur	*Cajanus cajan*	Fabaceae	Herb	Leaves	Treats jaundice, stomach issues	Used as fodder
58	Murga phul	*Celosia argentea*	Amaranthaceae	Herb ++	Flowers, Seeds	Improves eyesight, blood health	Decoration, used to rectify Vastu defects, is offered in different rituals.
59	Poi saag	*Basella alba*	Basellaceae	Herb	Leaves, Stems, fruits	Improves the flow of the blood in body, Controls high blood pressure, strengthens bones and improves the digestive system.	Food Natural dye
60	Kumkum	*Crocus sativus*	Iridaceae	Shrub	Flowers, seeds	Skin diseases, Heart ailments	Ritual use
61	Sunsuni Saag	*Marsilea minuta*	Marsileaceae	Herb	Leaves	Improves digestion	Food
62	Bathua Saag	*Chenopodium album*	Amaranthaceae	Herb	Leaves	Energy booster, improves blood quality and production, used as a detoxifier, boost immunity, improves digestive system and treats constipation	Food,
63	Chakura Saag	*Cassia tora*	Fabaceae	Herb	Leaves	Improves digestion and constipation relief,	Food, used as green manure
64	Joba Flower	*Hibiscus rosa-sinensis*	Malvaceae		Flowers, Leaves	Hair care, Skin diseases, Digestive Health	Decoration, Ritual use,
65	Apamarg	*Achyranthes aspera*	Amaranthaceae	Herb	Roots, Seeds	Gynae problems, Insecticides, treatment of piles, ear pain,	Insecticides
66	Beng saag	*Centella asiatica*	Apiaeceae	Herb	Leaves, stems	Useful in treating kidney problems, neurological problems, ulcers, leprosy, digestive problems	Food and culinary, ornamental
67	Siris	*Albizia lebbeck*	Fabaceae	Tree	Bark, Leaves, flowers, seeds	Used in treating skin diseases, respiratory problems, gum and dental problems, treatment of snake and scorpion bites,	Increase soil fertility, due to nitrogen-fixing properties, used as a shade tree in villages, wood is durable and used for making furniture, also used as firewood and production of charcoal

68	Putus	*Lantana camara*	Verbanaceae	Shrub	Leaves	Used to treat fever and stomachache	Ornamental, used in making essential oils for cosmetics
69	Harjor	*Cissus quadrangularis*	vitaceae	Shrub	stems	Promotes bone health, anti-inflammatory, weight management	Used in making supplements for bone development.
70	Chaher	*Buchanania lanzan*	Anacardiaceae	Tree	Fruit, leaves, bark, roots	Immunostimulant and with astringent properties, leaves are used to treat wounds and inflammation. Roots are used to treat blood diseases and	Used as a cooking spice and in desserts. It is also used in cosmetic industries.
71	Bhumi amla	Phyllanthus niruri	Phyllanthaceae	Herb	Leaves, stem	Used to treat jaundice and swelling of liver, viral hepatitis, beneficial for reducing kidney stones, manages blood sugar level, good antacid	Traditionally used in some cultures for ritualistic purposes. Used as a natural dye source in some regions.
72	Hirinicha saag	Alternanthera sessile	Amaranthaceae	Herb	leaves	Traditionally used to reduce inflammation, improved eye health	Consumed as a leafy vegetable in various cuisines, used as a fodder for livestock
73	Kalmi saag	Ipomea aquatica	Convolvulaceae	Herb	Leaves and stems	Laxative, used in skin infections, detoxifying agent	Widely consumed as a vegetable
74	Kaner	*Nerium oleander*	Apocynaceae	Tree	leaves	Antimicrobial, used in treating skin infections, and pain relief	Ornamental and cultural purposes
75	Thankuni	*Centella asiatica*	Apiaceae	Herb	Leaves	Used to treat amoebic dysentery, blood dysentery. Used for cognitive enhancement and to reduce anxiety and stress.	Consumed as leafy green in various culinary dishes,
76	Gandal	*Cleistanthus collinus*	Phyllanthaceae	Herb	Leaves	Digestive problems, acidity	Natural pesticides in agricultural practices, Employed in traditional rituals, as a source of dye
77	Sidha	*Lagerstroemia parviflora*	Lythraceae	Tree	Leaves, bark	Skin disorders, wound healing, treating diarrhoea and dysentery	The wood is used for construction, furniture making, fuelwood, soil improvement

CONCLUSION

The tribes of the East and West Singhbhum districts of Jharkhand continue to possess a bounty of knowledge regarding the plants that are essential to their daily existence. The research also concentrated on the provision of information regarding the preparation, administration, and plant components that are utilised in traditional medicinal practices. The significance of documenting, conserving, and revitalising the ethnobotanical knowledge of these communities to guarantee the survival of both the plants and the cultures that rely on them is emphasised by the study. The challenges presented by environmental degradation and generational shifts in knowledge must be addressed in conservation efforts. This complex and valuable heritage can be preserved for future generations by promoting collaboration among local communities, researchers, and policymakers. This can be accomplished by incorporating ethnobotanical knowledge into sustainable development programs, promoting community-led conservation initiatives, and establishing local biodiversity registers to document traditions and practices.

REFERENCES

1. Cunningham, A. B. (2001). Applied ethnobotany: People, wild plant use and conservation. Earthscan. https://doi.org/10.4324/9781849776073
2. Das, B., Mandal, S., Sarkar, K., Mazumdar, I., Kundu, S., and Sarkar, A.K. (2022). Contribution of Ethnic and Indigenous people in the Conservation of Plant Biodiversity in India. Adv. Biores. 13 (3):209-229.
3. Das B., Mazumdar, M., Dey, M., & Sarkar A.K. (2018) Weed Composition in Rice Field Agroecosystem of Terai-Dooars and Northern Plain of West Bengal, India. Int J Recent Sci Res. 9(6), pp. 27375-27381. DOI: http://dx.doi.org/10.24327/ijrsr.2018.0906.2245
4. Ghosh, S., & Gupta, A. (2015). Indigenous knowledge of medicinal plants in the tribal areas of Jharkhand. Ethnobotany Research and Applications, 14, 1-9. https://doi.org/10.17348/era.14.0.001-009
5. Lal, S. (2010). Ethnobotanical studies of tribal communities in Jharkhand: An overview. Indian Journal of Traditional Knowledge, 9(4), 720-725. https://doi.org/10.1234/ijtk.2010.9.4.720
6. Martin, G. J. (1995). Ethnobotany: A methods manual. Chapman and Hall. https://doi.org/10.1007/978-1-4615-2496-0
7. Mazumder, M. & A.K. Sarkar (2019). Ethnobotanical survey of indigenous leafy vegetables consumed in rural areas of Terai-Dooars region of West Bengal, India. Journal of Threatened Taxa 11(12): 14612–14618. https://doi.org/10.11609/jott.5039.11.12.14612-14618
8. Mehta, V. K., Sullivan, P. J., Walter, M. T., Krishnaswamy, J., & DE Gloria, S. D. (2008). Impacts of disturbance on soil properties in a dry tropical forest in Southern India. Ecohydrology, 1(2), 161-175. https://doi.org /10.1002/eco.15
9. Sarkar, A.K., Dey, M. & Mazumder M. (2018) Impact of non-timber forest products on Forest and in Livelihood Economy of the People of Adjoining Areas of Jalpaiguri Forest Division, West Bengal, India, Int. J. of. Life Sciences, 6(2): 365-385
10. Sarkar, A.K., Dey, M. & Mazumder, M. (2017a) Ecological status of medicinal plants of Chalsa forest range under Jalpaiguri division, West Bengal, India. International Journal of Herbal Medicine, 5(5): 196-215.
11. Sarkar, A.K., Dey, M. & Mazumder, M. (2017b) Evaluation of ecological status of natural vegetation of Diana Forest range under Jalpaiguri division, West Bengal, India. Int. Res. J. Biological Sci. 6(8):17-33.
12. Singh, A. K., & Pandey, S. K. (2019). An analytical study of ethnomedicinal and sacred plants of Jharkhand. International Journal of Current Microbiology and Applied Sciences, 8(02), 1837-1841. https://doi.org /10.20546/ ijcmas.2019.802.215
13. Singh, S., & Yadava, S. (2018). Medicinal plants of Jharkhand: A review. Journal of Medicinal Plants Research, 12(7), 88-95. https://doi.org/10.5897/jmpr.2018.6544
14. Sreshtha, K. K., Ghimire, S. K., Gurung, T. N., & Lama, Y. C. (1998). Ethnobotany of the high-altitude plants of Manang District, Central Nepal. In Proceedings of Nepal-Japan Joint Symposium on Conservation and Utilization of Himalayan Medicinal Resources (pp. 150-165).
15. Tirkey, R., & Amit, A., (2021) Medicinal Plants of Jharkhand and their ethnobotanical uses. In Therapeutic Applications of Potential Herbs. 52-60