ijlpr 2020; doi 10.22376/ijpbs/lpr.2021.11.1.L38-43

International Journal of Life science and Pharma Research

Research Article

Botany for Medicinal science

Diversity of Economically Useful Wild Plants of Jhalana Forest, Jaipur

Reenu Agarwal* and Shilpi Rijhwani**

**Asst. Prof. Department of Botany,IIS (Deemed to be University), Jaipur, Rajasthan, India*

***Associate Prof. Department of Botany, IIS (Deemed to be University), Jaipur, Rajasthan, India*

Abstract: The Biodiversity of an area influences every aspect of the lives of people who inhabit it. Their living space and their livelihood depend on the ecosystem. Even people living in urban areas are dependent on the ecological services provided by the wilderness in the protected areas. The indigenous communities have played a vital role in the development and management of the environment through their traditional knowledge and practice. They use abundant plant biodiversity as fodder, fuel, food, medicine etc. Jhalana forest, situated in the heart of the Jaipur city, spread across an area of 17 square kilometres. The Aravalli Mountain Range is located nearby and surrounds the area with thick forest, which is home to varied flora and fauna. The study is to document nearly 40 species of wild plants of economic uses. Analysis of taxonomic group of plants revealed that a total of 40 wild plants species belonging to 33 genera and 21 families were listed. Vegetation of the study area is mainly dominated by the *Anogeissus latifolia, Anogeissus pendula and Boswellia serrata*. Analysis of habits of plants documented show that trees share the largest proportion with 23species followed by shrub with 6 species, along with herb with 7species and Climber with 4 species Among the 40 species 26 are used as medicinal, 15 species are edible, 6 species used as fodder, 5 species used as fuel and 1 species is used as timber. Due to deforestation, colonization and industrialization there is an urgent need is felt to undertake ethnobotanical studies before extinction of the tribal life and Sustainable Utilization of wild plants.

Key Words: Biodiversity; Ethno botanical; Wild plants; Sustainable Utilization; Indigenous; Traditional knowledge

***Corresponding Author**

Reenu Agarwal , Asst. Professor. Department of Botany,IIS (Deemed to be University), Jaipur, Rajasthan, India

Recieved On 24 February 2020
Revised On 13 May 2020
Accepted On 06 June 2020
Published On 04 January 2021

Funding This research did not receive any specific grant from any funding agencies in the public, commercial or not for profit sectors.

Citation Reenu Agarwal and Shilpi Rijhwani , Diversity of Economically Useful Wild Plants of Jhalana Forest, Jaipur.(2021).Int. J. Life Sci. Pharma Res.11(1), L38-43 http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.1.L38-43

1. INTRODUCTION

Plants provide food and other life-supporting commodities and are very important for survival of human beings and other organisms. Besides, they protect our environment and maintain the balance in nature[1]. The evidence of men's dependency on plants for survival can be demonstrated by palaeo-ethnobotanical findings from prehistoric archaeological sites[2].Wild plants refer to plant species that are not cultivated or domesticated but are accessible from various natural habitations and used as food[3]. Wild plants are generally gathered from diverse habitats, viz, forests, cultivable fields, and even anthropogenically disturbed zones like roadsides and wastelands by different traditions throughout the world. A huge number of ethnic communities and local populace residing in the developing countries draw a significant part of their subsistence and livelihood from wild plants[4]. Historically, humans may have utilized more than 7000 wild edible plants so far[5], but many such food resources and valuable plants are still to be explored[6]. A floristic survey of ethno medicinal plants occurring in the tribal area of Rajasthan has been conducted in year 2004[7] A study on Sacred Groves in Shekhala Village in Rajasthan also been reported[8]. An ethnobotanical survey of tribal area of southern Rajasthan was carried out during the year 2001–2002 for ethno-sexicological herbal medicines[9]. Traditional knowledge on zootherapeutic uses by the Saharia tribe of Rajasthan[10] and Ethnomedical uses of biodiversity from Tadgarh-Raoli wildlife sanctuary of Rajasthan was reported[11]. The indigenous communities of Sariska and Siliserh regions from Alwar District use some wild plants species as a source of food, fodder, medicinal, timber etc.[12]. The study was conducted on some of the traditional ethnomedicinal plants of southern Rajasthan[13]. An extensive floristic survey has been conducted on wild edible plants[14] and ethnobotanical uses of medicinal plants in Chopta-Mandal forest of Garhwal Himalayas in Uttarakhand[15]. Humans have relied mostly on wild plants for nutritional and medicinal needs for example aromatic leaves of *Murraya koenigii* are highly valued, in different parts of Asia, for their utility as condiment and spice[16] and for medicinal properties such as antidiabetic, antidysenteric, antioxidant, anti-inflammatory, anticarcinogenic, and hepatoprotective[17-18].

2. MATERIALS AND METHODS

2.1 Study Area

Jhalana forest situated in the foothills of the Aravalli range, the forest is situated just outside the industrial area of the Jaipur city spread across the area of 17 square kilometers. It has a diverse topography, with the rocky Aravalli on one side and a forest of evergreen and deciduous trees stretching out on the other and framing its boundary. Jhalana offers topographical diversity with hills, valleys, plateaus, sand dunes, nallahs and gullies. Study area is situated on 26° 55' North latitude and 75° 49' east longitude, geographically it comes under semi-Arid Zone of India. It is characterized by high temperature, low rainfall and mild winter, the mean temperature is 36° C varying from 18° C in winter (January) to 40°C in summer (June) with normal rainfall of 600 mm, nearly 90% of which takes place in the summer monsoon period i.e. from June to September, the rest comes from the winter cyclones. It's a reserve forest area which is the home of different species of wild plants, around 20 leopards, over 100 species of birds, including raptors like shikras and white-eyed buzzards that shows the diversity of natural world and its resources.

2.2 Methodology

Regular field surveys were made in the study area during the year 2016 and 2017 in different seasons i.e., rainy, winter and summer to collect the wild plants. Field visits were made with the informants for collection of specimens. Identification of the collected specimens was made with the help of flora of Upper Gangetic plains Duthie (1903-1929), Flora of Indian Desert Bhandari (1990), Flora of Rajasthan-vol. 1-3 Sheety and Singh (1987-93). Herbarium specimens of the Department of Botany, University of Rajasthan, Jaipur were also consulted. Ethnobotanical information on wild plants was collected by interviewing local inhabitants based on a structured questionnaire to collect on local plant names, uses, part used and mode of utilization. In case of medicinal plants species, the respondents were also asked about the plant parts used and the local uses of medicinal plant species selected by them as the priority species. To determine the authenticity of the information collected during field work, repeated verification of data from different informants was done.

3. RESULTS

The study came to document nearly 40 species of wild plants of economic uses (table 1). Analysis of taxonomic group of plants revealed that a total of 40 wild plants species belonging to 33 genera and 21 families are documented (figure 1).

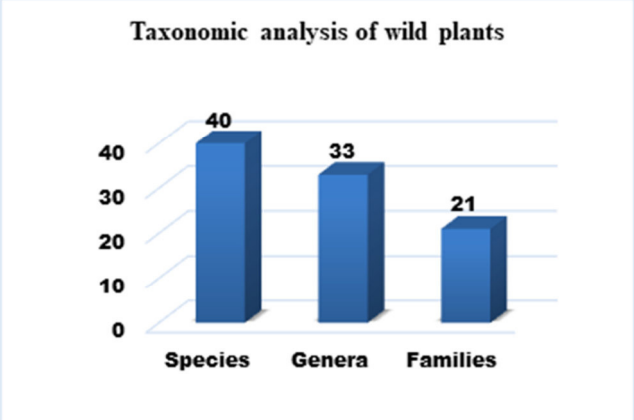

Fig. 1. Taxonomic analysis of wild plant

Analysis of habits (fig 2) of plants documented shows that trees share the largest proportion with 23 species (57%), followed by shrub with 6 species (15%), along with herb with 7 species (18%) and climber with 4 species (10%)

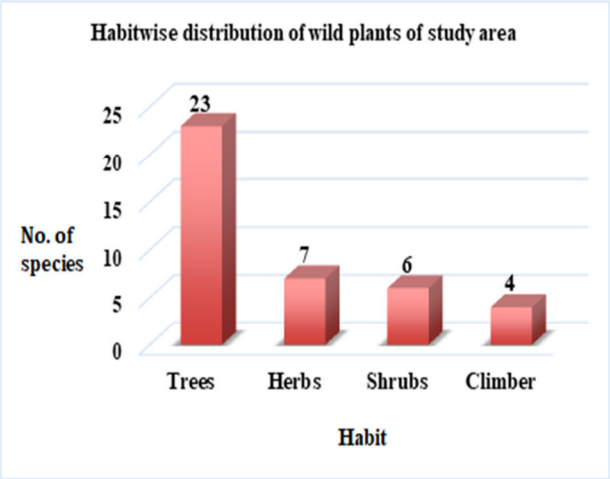

Fig.2. Habitwise distribution of wild plants in study area

Many wild plants are used by the local inhabitants for their day to day requirements of fodder, fuel, timber, agricultural tools and miscellaneous items. Among the 40 species, 26 are used as medicinal, 15 species are edible, 6 species used as fodder, 5 species used as fuel and 1 species is used a timber (fig.3).

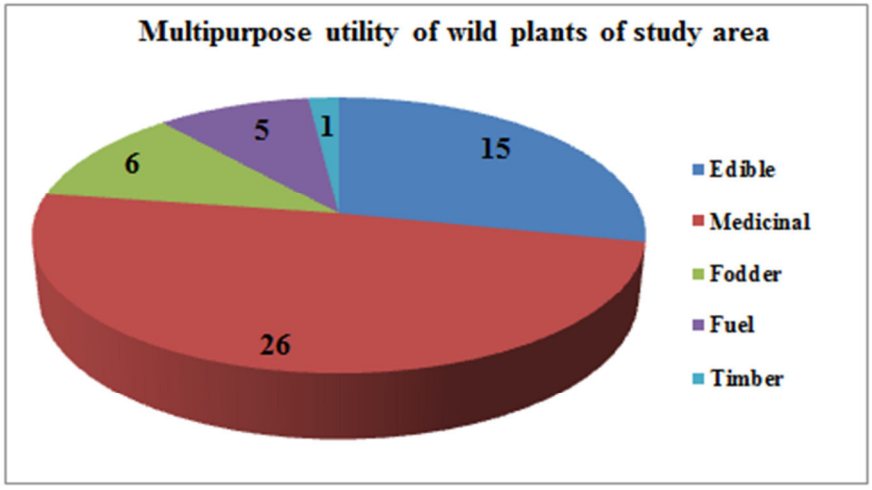

Fig.3. Multipurpose utility of wild plants of study area

Table 1: List of wild plants of study area

S.No.	Botanical Name	Local Name	Family	Habit	Uses
1.	*Abrus precatorius* Linn.	Rati, Chirmi	Papilionaceae	Climber	Seed powder is given to cattle to treat constipation
2.	*Acacia catechu* Willd.	Khair	Mimosaceae	Tree	Wood-edible; bark-astringent, bactericide, skin infections; leaves and young shoot as fodder
3.	*Acacia leucophloea* Roxb.	Ronjh	Mimosaceae	Tree	Leaves as Fodder
4.	*Acacia nilotica* Linn.	Babool	Mimosaceae	Tree	Bark and leaf paste for healing wounds and cuts, fuelwood
5.	*Acacia senegal* Willd.	Khairi	Mimosaceae	Tree	Seeds - edible
6.	*Acacia tortilis* (Forsk.) Hayne	Israili Babool	Mimosaceae	Tree	Used as fuelwood
7.	*Achyranthes aspera* Linn.	Onga	Amaranthacae	Herb	Whole plant – antiparasitic, anticancer, anti-inflammatory, anti-depressant
8.	*Adhatoda vasica* Nees	Adusa	Acanthaceae	Shrub	Leaves, Flower - Bronchitis and asthma

9.	*Anogeissus latifolia* Wall	Dhavada	Combretaceae	Tree	Bark - antifungal, antibacterial, anti-inflammatory; wood as timber and fuel; leaves and young shoot as fodder.
10.	*Anogeissus pendula* Endgew	Dhok	Combretaceae	Tree	Used as fuelwood; leaves and young shoot as fodder.
11.	*Argemone mexicana* Linn.	Satyanashi	Papaveraceae	Herb	Whole plant - antimicrobial, antidiabetic, antioxidant
12.	*Azardirachta indica* L.	Neem	Meliaceae	Tree	Fruits – Edible; leaf, flower, bark, stem – antioxidant, antifungal, antidiabetic, antibacterial, blood purification
13.	*Bauhinia racemosa* Lamk.	Jhinjha	Caesalpiniaceae	Tree	Young flower buds as vegetable, good fodder
14.	*Bombax ceiba* Linn.	Samel	Malvaceae	Tree	Young Fruits - Edible
15.	*Boswellia serrata* Roxb.	Salar	Bursaraceae	Tree	Bark, stem, leaves, flowers – anti-arthritic, used in cold and fever, anti-inflammatory, antifungal
16.	*Cactus opuntia* Linn.	Thapla, Thor	Cactaceae	Shrub	Fruits - Edible
17.	*Calotrapis procera* Ait. R.Br.	Ankda	Asclepiadaceae	Shrub	Leaves - Scorpion bite
18.	*Cannabis sativa* Linn.	Bhang	Papilionaceae	Herb	Aerial Part - Ringworm, analgesic, sedative
19.	*Cocculus hirsutum* Linn.	Peelwani	Monispermaceae	Climber	Leaves to treat skin infections
20.	*Cuscuta reflexa* Roxb.	Amarbail	Convolulaceae	Climber	Whole plants for treatment of urinary disorders, cough, muscle pain and as blood purifier
21.	*Diospyros melanoxylon* Roxb.	Tendu	Ebenaceae	Tree	Leaves and young shoot as fodder.
22.	*Emblica officinalis* Gaerth	Awla	Euphorbiaceae	Tree	Fruits - edible, Medicinal – used in diabetes, cardiac complications, antioxidant, dental treatment
23.	*Evolvulus alsinoides* Linn.	Shankh Pushpi	Convolvulaceae	Herb	Whole plant for treatment of fever, neuro disoders
24.	*Holoptelia integrifolia* Roxb.	Churel, Papdi	Ulmaceae	Tree	Fruits – edible; leaves – antioxidant, antidiabetic
25.	*Mitragyna parviflora* Roxb. Korth	Kadam	Rubiaceae	Tree	Leaves - anti-inflammatory, used in liver disorders
26.	*Moringa oleifera* Lamk.	Shaijana	Moringaceae	Tree	Fruits – edible; roots and stem used in swellings, tumour and in rheumatic pain.
27.	*Ocimum americanum* L.	Van Tulsi	Lamiaceae	Herb	Leaves for fever, Cough and cold
28.	*Prosopis cineraria* Linn.	Khajedi	Mimosaceae	Tree	Leaves, seed, fruits are used as vegetable; flowers, bark, leaves – antidiabetic, anti-bacterial, used in treatment of bronchitis, asthma, dysentery; fuelwood
29.	*Prosopsis juliflora* Sw. DC.	Vilayati Babool	Mimosaceae	Tree	Used as fuelwood, good fodder
30.	*Rhus mysorensis* Don.	Darsan, Dhansale	Anacardiaceae	Shrub	Fruits - edible
31.	*Salvadora persica* Linn.	Jal	Salvadoraceae	Tree	Bark and seeds – gastric troubles, skin infections
32.	*Sapindus emarginatus* Vahl	Aritha	Sapindaceae	Tree	Fruits used in treatment of asthma, dysentery and during childbirth
33.	*Solanum nigrum* Linn	Makoi	Solanaceae	Herb	Fruits - Edible
34.	*Tamarindus indica* Linn.	Imli	Leguminoceae	Tree	Fruits - Edible
35.	*Tecomella undulata* G. DON	Rohida	Bignoniaceae	Tree	Roots used in treatment of Leucorrhoea in females and bark to cure to cure eczema and eruptions.
36.	*Tinospora cordifolia* Thunb.	Neem Giloy	Menispermaceae	Climber	Stem used for diabetes, rhinitis and to boost immune system

	Miers				
37.	*Tridax procumbens* Linn.	Molya, Mahendi	Compositae	Shrub	Leaves – antifungal, anticoagulant, insect repellent
38.	*Wrightia tinctoria* Roxb. R.Br.	Khirani	Apocynaceae	Tree	Flower – antibacterial, antioxidant
39.	*Xanthium strumarium* Linn.	Aadhashishi	Compositae	Herb	Leaves and roots used as anodyne, antirheumatic, appetizer, diuretic
40.	*Zizyphus nummularia* Wt. & Arn	Jhadbair	Rhamnaceae	Shrub	Fruits – edible; leaves are used in various skin diseases treatment.

4. DISCUSSION

Use of wild plants is still under existence whenever and where they are available. These wild plants play an important role for the food security of native communities. Present study is done to provide baseline information on the diversity and indigenous uses of wild plants found in the study area. People are interested to consume them because of their taste and healing properties. These species are assumed to be highly nutritive and medicinal[19-20]. Collection of all these plant species is done during the time of grazing by their livestock or fuel wood and fodder collection. Inhabitants utilize wild edible plants as raw food, roasted, cooked or boiled. Although, most species are not widely consumed many can be important as supplementary foods. Wild edible plants are important and cheap sources of proteins, fats, vitamins and minerals and also nutritional content of some of wild edible plants is found to be higher than several common vegetables and fruits[21]. Out of the discussed species, sangari (*Prosopis cineraria*) is stored for lean period when the cultivated vegetables are scarce and is sold in few nearby local markets. Still this species also do not have a huge market because of its less and seasonal productivity from the nearby forest areas. The value addition of the product can increase the cash return from the wild plants multifold by processing it into pickle, dry storing, spices etc., for example *Acacia catechu* besides its traditional utility is widely utilized commercially for extracting Katha from the heart wood which has a huge Indian market. However harvesting or collection and consumption of wild plants in a huge quantity also provide the opportunity to decrease their population form their natural habitats[22-23]. Out of 40 species 26 are used for medicinal purposes. Various plant parts of these species like leaves, roots, flower, fruits etc. have been extensively collected by the local people for treating different ailments. These plants are being used by various ethnic groups and rural people in many parts of the Rajasthan to treat ailments such as injuries, wounds, cuts, fever, diarrhoea, ulcers, swelling, bone fractures, potency, antipoisons, skin care, night blindness, toothache, asthma, cough and cold by using fresh as well as dried plant materials [24-25-26]. Documentation of such information will help in developing new drugs through further researches. The information on the traditional uses of plants will certainly help in developing many strategies for the conservation and management of economically important species[27-28]. Rapid deforestation caused by over–harvesting and exploitative trade of medicinal plants has significantly reduced the availability of the medicinal plants in arid and semi–arid region of Rajasthan[29]. Since large number of household raised livestock many wild plant species like *Anogeissus pendula*, *Bauhinia racemosa*, *Diospyros melanoxylon* are utilized as animal feed and these forage species are also important particularly during the lean period when green forage is not available. The use of plants for fodder, green or dry is still practiced in the rural areas. The collection of fuel wood is yet another important household activity in the study area many species like *Acacia nilotica*, *Prosopsis juliflora* provides the main source of energy for cooking. The fallen twigs of various species collected are also used as fuel wood. Therefore, it may be concluded that the forest plays a more important role in the supply of household energy also[30]. The rural communities use a wide range of wild plants extracted from the forests for a wide range of purposes and that access to these resources was nevertheless important as they contributed substantial direct use values to their livelihoods. Economically most communities generate income from a wide range of wild plants[31-32].

5. CONCLUSION

Due to many anthropogenic factors, human induced climatic changes have become increasingly important in our everyday lives and inevitably will continue to do so. This describes current status of climatic changes in the forests and wood land of Jhalana hills, Jaipur. Observed changes in the abiotic environmental factors like temperature, water availability, wind humidity and rising carbon dioxide level together have adverse potential impacts on forest growth and threats. Rapid rate of industrialization, urbanization, agricultural development and population growth have greater pressure on the land water and vegetation, resulting in the degradation of tree resources. Similarly in the foot of Jhalana hills complete changes are occurring in the habitat, habitation and biodiversity due to urbanization and colony formation.

6. AUTHORS CONTRIBUTION STATEMENT

Dr. Shilpi Rijhwani conceived the idea and guided in conducting this research study. Dr. Reenu Agarwal collected the data, wrote the manuscript and analysed the data. All authors discussed the results and contributed to the final manuscript.

7. CONFLICT OF INTEREST

Conflict of interest declared none.

8. REFERENCES

1. Renfrew JM. Paleoethnobotany: the prehistoric food plants of the near east and Europe. Columbia University Press; 1963.

2. Smith JE. Mesas, cliffs, and canyons: the University of Colorado survey of mesa Verde national Park. Mesa: Verde Museum; 1971-1977 Association. Mesa Verde C 1987.

3. Beluhan S, Ranogajec A. Chemical composition and non-volatile components of Crotial wild edible mushrooms. Food Chem. 2010; 124: 1076-82.
4. Schippmann U, Cunningham AB, Leaman DJ. Impact of cultivation and gathering of medicinal plants on biodiversity: global trends and issues. In: Biodiversity and the ecosystem approach in agriculture, forestry and fisheries. Rome: Food and Agriculture Organization; 2002.
5. Grivetti LE, Ogle BM. Value of traditional foods in meeting macro- and micronutrient needs: the wild plant connection. Nutr Res Rev. 2000; 13(1):31-46. doi: 10.1079/095442200108728990, PMID 19087432.
6. Mohan Ram HY. Plant Resources of Indian Himalaya 9th GP Pant Memorial Lecture, G B Pant Institute of Himalayan Development. Gangtok: SKM; 2000.
7. Katewa SS, Chaudhary BL, Jain A. Folk herbal medicines from tribal area of Rajasthan, India. J Ethnopharmacol. 2004; 92(1):41-6. doi: 10.1016/j.jep.2004.01.011, PMID 15099845.
8. Singh GS, Saxena KG. Sacred groves in the rural landscape: a case study of Shekhala village in Rajasthan. In: Conserving the sacred for biodiversity management. 1998 ed.
9. Jain A, Katewa SS, Galav PK, Nag A. Unrecorded ethnomedical uses of biodiversity from Tadgarh-Raoli wildlife sanctuary, Rajasthan, India. Acta Bot Yunnanica. 2007; 29(3):337-44.
10. Mahawar MM, Jaroli DP. Traditional knowledge on zootherapeutic uses by the Saharia tribe of Rajasthan. Indian J Ethnobiol Ethnomed. 2007; 3: 25.
11. Jain A, Katewa SS, Chaudhary BL, Galav P. Folk herbal medicines used in birth control and sexual diseases by tribals of southern Rajasthan, India. J Ethnopharmacol. 2004; 90(1):171-7. doi: 10.1016/j.jep.2003.09.041, PMID 14698527.
12. Jain SC, Jainand R, Singh R. Ethnobotanical Survey of Sariska an. d Siliserh Regions from Alwar District of Rajasthan, India. Ethnobotanical Leafl. 2009; 13: 171-88.
13. Meena KL, Yadav BL. Indian J Trad Knowl. 2010; 9(1):169-72.
14. Agarwal R, Chandra V. Diversity of wild Plants in the Mandal -Chopta forest, Uttarakhand. J Med Plants Stud. 2019; 1: 89-92.
15. Agarwal R. Ethnobotanical studies of medicinal plants in Chopta-Mandal forest of Garhwal Himalayas in Uttarakhand. J Pharmacogn Phytochem. 2019; 8(2):774-6.
16. Gara CE, Omoboyowa DA, Ahuchaogu AA, Orji NU, Ndukwe MK. Phytochemical and nutritional profile of *Murraya koenigii* (L.) Spreng leaf. J Pharmacogn Phytochem. 2016; 5(5):07-9.
17. Jain M, Gilhotra R, Singh RP, Mittal J. Curry leaf (*Murraya koenigii*): a spice with medicinal property MOJ. Biol Med. 2017; 2(3): 00050.
18. Kirupa SLS, Kariitha R. Anti-oxidant enhancing property of curry leaf powder *Murraya keonigii* in type II diabetes mellitus. Int J Pharm Biol Sci. 2015; 6(1):507-14.
19. Kumar R et al. Impact of urbanization on biodiversity of Jhalana hills and around it in Jaipur city. Elixir Biogr Div. 2011; 32: 2100-3.
20. Rathore M. Nutrient content of important fruit trees from arid zone of Rajasthan. Journal of Horticulture and Forestry, 2009; 1(7): 103-108
21. Sundriyal M, Sundriyal RC, Wild edibles plants used by the tribes of Sikkim Himalaya: Nutritive value of selected species. Econ Bot, 2011; 5(3): 377-390.
22. Katewa, SS, Choudhary, BL, Jain A, Galav, PK.Traditional uses of plant biodiversity from Aravalli hills of Rajasthan, Indian Journal of Traditional Knowledge, 2003; 2(1): 27-39.
23. Goyal M, Sharma SK. Traditional wisdom and value addition prospects of arid foods of desert region of North West India. Indian Journal of Traditional Knowledge, 2009; 8(4): 581-585.
24. Singh GS. A contribution of ethnomedicine of Alwar district of Rajasthan. Ethnobotany; (1999) 97; 11.
25. Katewa SS, Nag A, Guria BD. Ethnobotanical studies of wild plants for food from the Aravalli hills of south east Rajasthan. J. Econ. Txon. Bot. 1999; 23(2): 259.
26. Jain A, Katewa SS, Galav PK. Some Phytotherapeutic claims by tribals of southern Rajasthan. Indian J Traditional Knowledge, 2005; 4(3): 291.
27. Trivedi PC. Ethno-medicinal Plants of Rajasthan State India. In: Ethnobotany, edited by PC Trivedi, (Aavishkar Publishers & Distributors, Jaipur), 2002; 412.
28. Sharma NK. Ethno-medico-religious plants of Hadoti Plateau (SE Rajasthan) - A Preliminary Survey, In: Ethnobotany, edited by PC Trivedi, (Aavishkar Publishers & Distributors, Jaipur), 2002; 394.
29. Maheshwari S, Sharma A. Ethnobotanical studies on medicinal plants in Hadoti region of Rajasthan. Journal of Pharmacognosy and Phytochemistry, 2019; 8(2): 546-549
30. Das KC, Sahoo UK, Rocky P. Utilization of forest products as livestock feed. Journal of North Eastern Council, 2004; 24(1):15-19.
31. Malhotra KC, Deb D, Dutta M, Vasulu T, Yadav G, Adhikari M. The role of non-timber forest products in village economics of South-West Bengal. Rural Development Forestry Network Paper, 15d (ODI Regent's College, Regent's Park, London), 1993; 1-8.
32. Sahoo UK, Singh RKPG. Trade & marketing of non-timber forest products in northeast India: some issues on rural development. In: Goutam, H.C. and Bezbaruah, M.P. (eds) Rural transformation in northeast India. Ruby Art Press, Guwahati. 2006; 159-173.