



Urban Ethnobotany of Jammu: Documentation of Ethno-Medicinal Plants Used in Diabetes Management

Rishita Khajuria ^a, Roshi Sharma ^b and Abhishek Dutta ^{c*}

^a Cluster University of Jammu, Jammu & Kashmir -180001, India.

^b Government Degree College, Paloura, Jammu & Kashmir - 181121, India.

^c Department of Botany, University of Jammu, Jammu & Kashmir - 180006, India.

Authors' contributions

This work was carried out in collaboration among all authors. Authors RS and AD conceptualize the study. Author RK carried out the field surveys and collected the data. Author AD identified the plants and analyzed the data. Author RK wrote the manuscript and authors RS and AD reviewed the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

The present investigation deals with the use of ethnomedicinal plants for diabetes management in urban areas of Jammu. Several field surveys were conducted in Jammu district from the year from 2022 to 2024, for the documentation of medicinal plant usage among local communities. The data were collected through interviews with the local inhabitants using semi-structured questionnaires. Plant species were documented, collected, identified and categorized based on their anti-diabetic properties. A total of 20 plant species spread over 19 genera and 14 families were reported having anti-diabetic ethnomedicinal uses. Among these, eight species such as *Alstonia scholaris*, *Butea monosperma*, *Eucalyptus globulus*, *Hibiscus x rosa-sinensis*, *Ipomoea carnea*, *Kalanchoe pinnata*,

*Corresponding author: Email: abhishek Dutta492@gmail.com;

Monoon longifolium, and *Oxalis corniculata* were novel addition to the ethnobotanical knowledge of Jammu & Kashmir. The findings further highlight the urgent need for conservation efforts to safeguard both medicinal plant biodiversity and indigenous knowledge, promoting sustainable practices and integrating traditional plant-based remedies along with modern healthcare diabetes management while preserving cultural heritage.

Keywords: Urban ethnobotany; diabetes; medicinal plants; novel; hibiscus.

1. INTRODUCTION

Diabetes is a complex metabolic disorder diagnosed by persistently elevated blood sugar levels, primarily caused by impaired insulin action, insufficient insulin secretion or a combination of both. (Suji and Sivakami, 2003; Mirhoseini et al., 2013). Diabetes affects approximately 100 million people each year and is ranked as the seventh leading cause of death globally. A recent statistical update from the International Diabetes Federation (IDF) indicate that an estimated 537 million adults, aged 20 to 79 are currently living with diabetes. This number is expected to increase to 643 million by 2030 and probably 783 million by 2045 (Parasher et al., 2024) The Indian subcontinent has emerged as a major hotspot for this growing health crisis. Among adults aged 20 to 79, the estimated prevalence rates of the disease are 8.31% in India compared to the 7.77% in Sri Lanka, 6.72% in Pakistan, and just 3.03% in Nepal (Rizvi and Mishra, 2013). Nagarathna et al., 2020 recorded that the number of individuals with diabetes in India is expected to reach 79.4 million by the year 2030.

Diabetes manifests in different forms, Type I, Type II, and gestational diabetes are the most prevalent ones. Type I diabetes arises when beta cells of pancreas fail to produce adequate insulin, and it is more commonly diagnosed in children. In contrast, Type II diabetes occurs when insulin receptors become resistant to the insulin produced by the body (Neamsuvan et al., 2015). Type II form is the most widespread and is often linked to an unhealthy lifestyle, including poor diet, physical inactivity, stress, and obesity, on the other hand, gestational diabetes develops during pregnancy. Clinically, Diabetes mellitus is recognized as a silent disease, contributing as one of the major risk factors for health (Lima et al., 2016). Uncontrolled management makes the patients susceptible to developing complications like nephropathy, retinopathy, neuropathy, and cardiovascular diseases which add to the morbidity of the disease leading to premature deaths (Padhi et al., 2020).

1.1 Modern Allopathic Medicine

Managing diabetes mellitus remains a global challenge causing many countries to declare it as a pandemic of the 21st century. The primary and most effective treatments for diabetes mellitus are Insulin injections and hypoglycemic agents which are commonly used to regulate the blood sugar levels in the patients. However, these medications are associated with various limitations like limited tolerability, high cost, and other potential side effects making them less effective in preventing long-term complications of the disease (Swanston-Flatt et al., 1989; Parasuraman et al., 2014). Given the growing understanding of diabetes and its associated risks, there is a need to identify alternative treatments with fewer adverse effects. Medicinal plants serve as valuable sources for potential complementary or alternative therapies for diabetes and other health conditions (Eddouks et al., 2014).

1.2 Herbal Remedy

The use of medicinal plants has contributed to a decline in the occurrence of various diseases due to their protective effects against oxidative damage and their ability to reduce inflammation. WHO accounts that nearly 90% of diabetes patients in developing countries depend on plant-based remedies for managing the disease. Globally, around 21,000 medicinal plant species have been identified, with approximately 2,500 of them found in India (Rani et al., 2020). Among these, about 800 plant species have been recognized for their antidiabetic properties (Patil et al., 2011). Recent studies have focused on exploring traditional uses, evaluating the *in-vitro* effects of medicinal plants, and identifying their bioactive compounds to develop herbal medicines (Asadi-Samani et al., 2017). Several researchers have worked on the plants which are traditionally used by various indigenous communities against diabetes in different parts of India (Ryakala et al., 2010; Thirumalai et al., 2012; Mishra et al., 2019; Das et al., 2023; Singh et al., 2023) and Jammu & Kashmir (Bhatia et al.,

2014; Gairola et al., 2014; Shah et al., 2015; Ajaz and Ahmed, 2017; Khan and Paul, 2017; Parasher et al., 2024), but there is no report of plants being used by the indigenous populace district Jammu against diabetes. Keeping this in view, the present study was conducted to identify the plants growing in the urban areas and used by the people, who have access to the allopathic medicine, as an alternative medicine for the prevention and treatment of diabetes.

2. MATERIALS AND METHODS

2.1 Study Area

Jammu District, one of the districts of Jammu province, is the winter capital of Jammu and Kashmir (J&K), the northernmost Union Territory of India. The district shares its borders with Pakistan and Ladakh. Jammu district and is located along the banks of the Tawi River. It lies between 32°44'46" N and 75°50'51" E, with an average elevation of 327 meters above sea level, and is divided into 21 tehsils. The district experiences a subtropical and humid climate, with summer temperatures reaching up to 46°C and winter temperatures dropping to 4°C (Saleem et al., 2024)

2.2 Survey and Data Collection

Systematic and extensive field surveys were conducted from June 2022 to July 2024 across various locations in Jammu district, including Nagrota, Gandhi Nagar, Canal Road, R.S. Pura, Shakti Nagar, Akhnoor and Khour (Table 1). The exploration covered diverse plant habitats such as roadsides, riverbanks, forests, meadows, valleys, and grasslands to document the ethnomedicinal flora of the region. Informants were selected randomly from the study area for the documentation of traditional knowledge and prior informed consent were taken from the them. Informants were chosen from different age groups and occupation like students, businessmen, shopkeepers, milkmen, teachers, elder people and were interviewed using semi-structured questionnaire and asked about the local name of plant, parts used, ailments treated etc. Plants mentioned by the informants which are traditionally used against several disease were collected from the nearby urban areas and were dried, mounted on herbarium sheets and identified by consulting the regional herbaria like herbaria of the Department of Botany, University of Jammu (HBJU), and Janaki Ammal Herbarium, Indian Institute of Integrative

Medicine (RRLH), Jammu, and with the help of various regional floras (Kachroo et al., 1977; Sharma and Kachroo 1981; Dhar and Kachroo, 1983; Singh and Kachroo, 1994; Swami and Gupta, 1998). The latest accepted names and nomenclatural classification of the taxa were checked using Plants of the World Online (POWO, 2025).

Table 1. Study sites visited

S. No.	Study Site	Geo-Coordinates
1	Nagrota	32°47'54" N 74°54'54" E
2	Gandhi Nagar	32°42'09" N 74°51'33" E
3	Canal Road	32°43'48" N 74°50'51" E
4	R.S. Pura	32°36'17" N 74°43'53" E
5	Shakti Nagar	32°44'13" N 74°50'22" E
6	Akhnoor	32°53'54" N 74°44'11" E
7	Khour	32°50'38" N 74°27'32" E

3. RESULTS AND DISCUSSION

3.1 Diversity of the Plant Species

The present study identified twenty plant species from 19 genera and 14 families, which are traditionally used by the urban population of Jammu district for diabetes management (Table 2, Fig. 1). Among the plant families, Fabaceae exhibited the highest representation with three species, followed by Apocynaceae, Cucurbitaceae, Moraceae, and Myrtaceae, each contributing two species. The remaining families were represented by a single species each (Fig. 2). Literature also supported that the species from Fabaceae and Apocynaceae have been widely used for diabetes treatment in Odisha and Telangana (Das et al., 2023; Singh et al., 2023). Interestingly, the present study also revealed that the Fabaceae was the most prevalent family associated with diabetes treatment.

In this study, trees were found to be the most commonly utilized plant habit for diabetes treatment, accounting for 50% of the recorded species. This was followed by herbs (25%), shrubs (15%), and climbers (10%) (Fig. 3). Similar findings have been reported in previous studies (Mishra et al., 2019; Singh et al., 2020; Das et al., 2023; Singh et al., 2023), where trees

were identified as the primary source of antidiabetic plants. The preference for trees may be attributed to the diverse usable parts, availability, abundance of bioactive compounds and deep-rooted significance in traditional medicine.

Of the various plant parts used, leaves, flowers, fruits, and stem bark were the most frequently used (18.75%), followed by roots (9.38%),

while whole plants and stems contributed 6.25% each, and seeds were the least used (3.13%) (Fig. 3). Previous studies have also been highlighted the major uses of leaves for diabetes treatment (Begum et al., 2018; Singh et al., 2020; Das et al., 2023; Singh et al., 2023). However, Naini and Mamidala (2013) reported roots as the dominant plant part used in diabetes management.

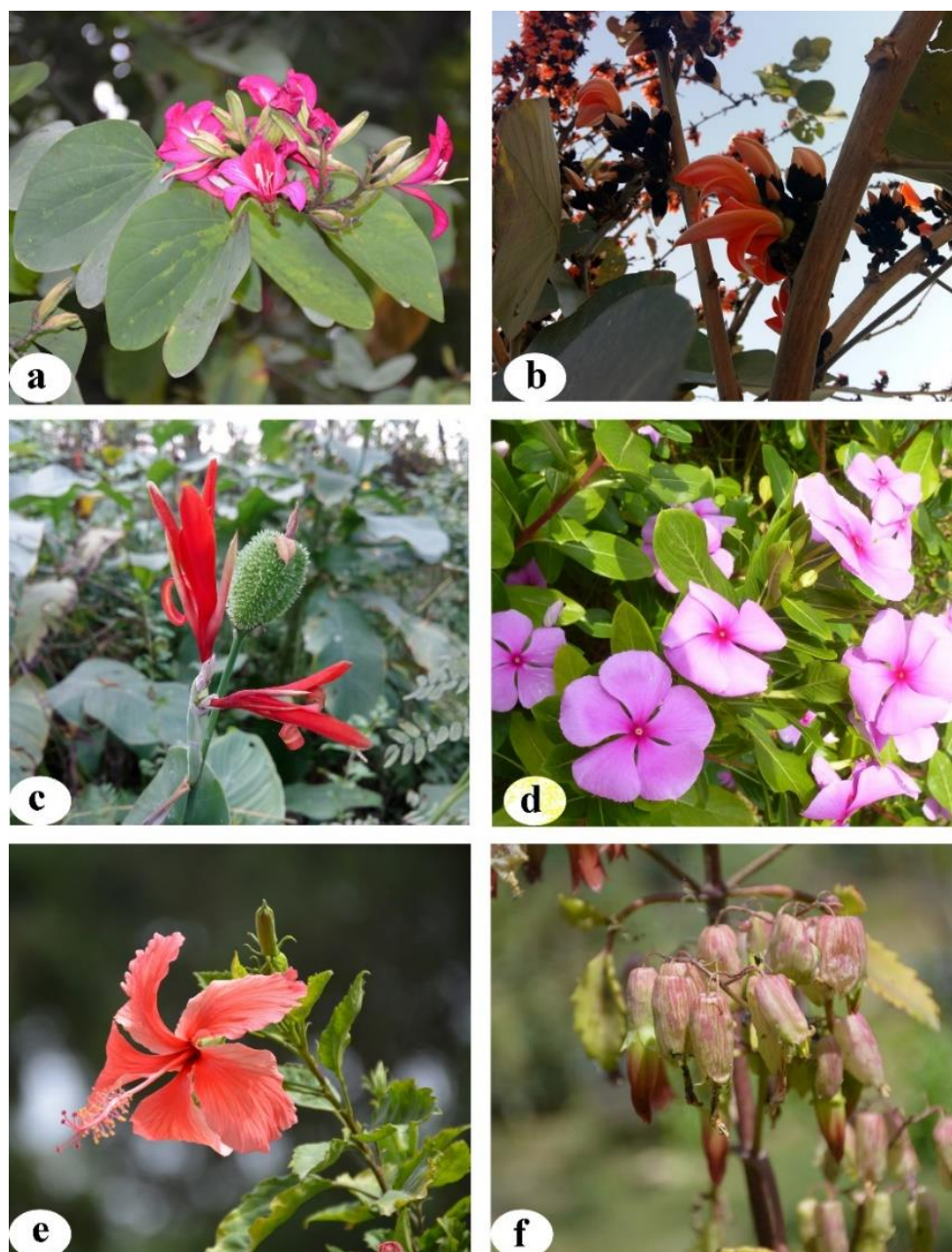


Fig. 1. Some of the plant species used against diabetes: a) *Bauhinia purpurea*, b) *Butea monosperma*, c) *Canna indica*, d) *Catharanthus roseus*, e) *Hibiscus x rosa-sinensis*, f) *Kalanchoe pinnata*

Table 2. Plants used by the local people of district Jammu to treat diabetes and status of the species in Ayurvedic Pharmacopeia of India (API)

Botanical name	Family	Local Dogri names	Habit	Flowering and Fruiting	Part used as medicine	API status
<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Satpatra	Tree	March to July	Stem bark	Mentioned
<i>Bauhinia purpurea</i> L.	Fabaceae	Kalyad	Tree	September to November	Flowers	Not mentioned
<i>Butea monosperma</i> (Lam.) Kuntze	Fabaceae	Plah	Tree	February to June	Flowers	Mentioned
<i>Canna indica</i> L.	Cannaceae	Keli	Herb	June to October	Seeds	Not mentioned
<i>Catharanthus roseus</i> (L.) G.Don	Apocynaceae	Sadabahar	Shrub	April to September	Flowers	Not mentioned
<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Kantoori	Climber	August to September	Fruits	Mentioned
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Safeda	Tree	September to March	Leaves	Mentioned
<i>Hibiscus x rosa-sinensis</i> L.	Malvaceae	Gulhar	Shrub	March to October	Flowers, Leaves and Roots	Not mentioned
<i>Ipomoea carnea</i> G.Frost	Convolvulaceae	Akk	Herb	March to November	Stem	Not mentioned
<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae	Goethe	Herb	November to March	Whole plant, Leaves	Not mentioned
<i>Lawsonia inermis</i> L.	Lythraceae	Maendi	Shrub	April to September	Stem bark, Roots, Flowers	Mentioned
<i>Mangifera indica</i> L.	Anacardiaceae	Amb	Tree	March to July	Roots, Stem bark, Leaves, Fruits	Mentioned
<i>Momordica charantia</i> L.	Cucurbitaceae	Karela	Climber	June to October	Fruit	Not mentioned
<i>Monoon longifolium</i> (Sonn.) B.Xue & R.M.K.Saunders	Fabaceae	Sita shok	Tree	March to July	Stem bark	Not mentioned
<i>Morus alba</i> L.	Moraceae	Toot	Tree	April to June	Stem bark	Not mentioned
<i>Morus nigra</i> L.	Moraceae	Shehtoot	Tree	April to August	Fruits	Not mentioned
<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Tulsi	Herb	June to October	Stem, Leaves, Flowers	Mentioned
<i>Oxalis corniculata</i> L.	Oxalidaceae	Changeri ghaa	Herb		Whole plant	Mentioned
<i>Phyllanthus emblica</i> L.	Phyllanthaceae	Ambla	Tree	March to July	Fruits	Mentioned
<i>Psidium guajava</i> L.	Myrtaceae	Marood	Tree	April to September	Stem bark, Leaves, Immature fruits	Not mentioned

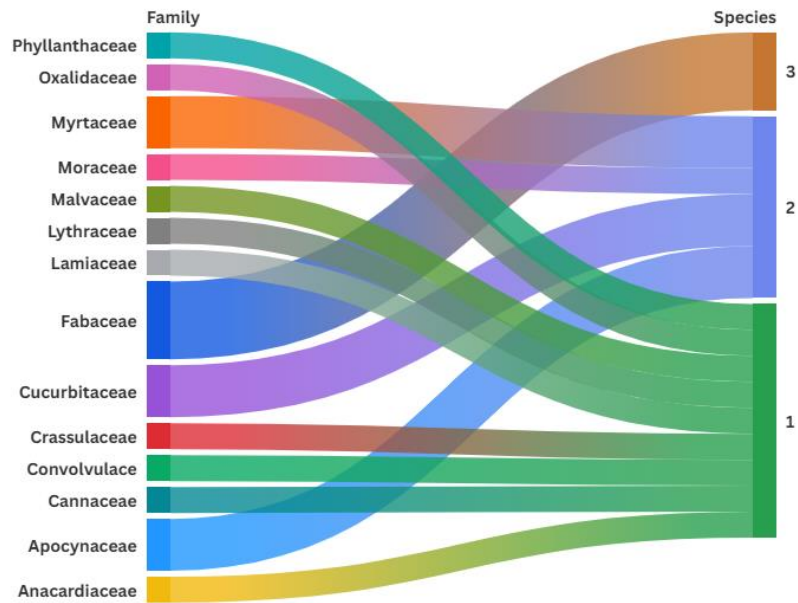


Fig. 2. Alluvial diagram showing the number of species in the respective families

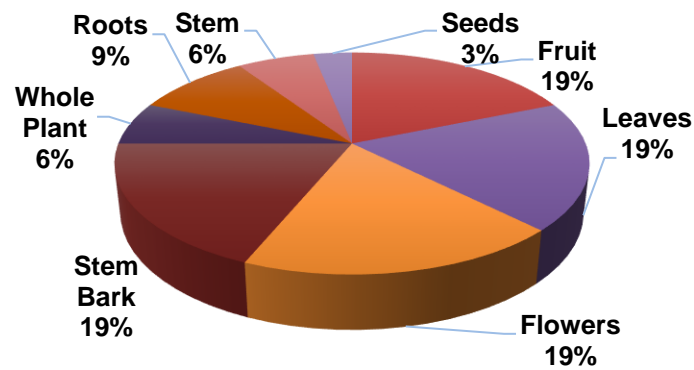


Fig. 3. Percentage of plant parts used in herbal anti-diabetic remedies

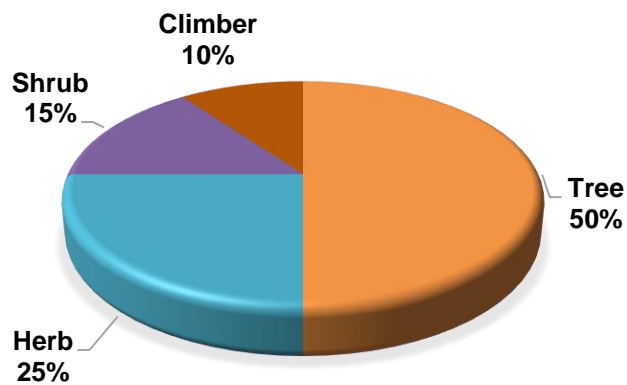


Fig. 4. Percent contribution of different ethno-medicinal plant habit

3.2 Usage of Medicinal Plants

In the present study, the stem bark of *Alstonia scholaris* has been recorded for its use in diabetes treatment, while previous studies have documented its medicinal applications for conditions such as dyspepsia, liver disorders, diarrhea, and skin diseases (Akhtar & Bano, 2002; Banik et al., 2010). However, its specific use against diabetes in Jammu and Kashmir has not been previously reported, making this a novel ethnomedicinal claim for the region.

Similarly, the flowers of *Bauhinia purpurea* have been widely recognized for their antidiabetic properties in various global studies (Malaysia, 2023; Gudavalli et al., 2024), but no prior documentation exists regarding their use for diabetes treatment in Jammu and Kashmir. In urban areas of Jammu, the flowers of *Butea monosperma* are utilized for diabetes management, a well-established medicinal application (Somani et al., 2006; Ahmed et al., 2012; Talubmook & Buddhakala, 2012). However, while *B. monosperma* flowers have previously been reported in Jammu and Kashmir for treating urinary retention and irregular menstruation (Shah et al., 2015; Rao et al., 2015), but their role in diabetes treatment has not been documented before. This finding represents a novel addition to the ethnobotanical knowledge of the region.

Similarly, the seeds of *Canna indica* have been documented for their antidiabetic properties in the study area. However, previous research by Vanita and Sunita (2018) highlighted the potential of its roots in diabetes management. Similarly, the fruits of *Coccinia grandis* are commonly used in the study area for diabetes treatment, a practice that has also been documented in other regions (Hossain et al., 2024). Additionally, this usage was previously reported from the Kathua district of Jammu & Kashmir (Parasher et al., 2024).

Several plants, including *Eucalyptus globulus*, *Hibiscus x rosa-sinensis*, *Ipomoea carnea*, *Kalanchoe pinnata*, *Monoon longifolium*, and *Oxalis corniculata*, have been extensively studied for their antidiabetic properties (Rahmatullah et al., 2009; Raj et al., 2014; Revathi et al., 2017; Begum et al., 2018; Abdelaali et al., 2023; Bisht et al., 2024). However, no prior records exist of these species being used for diabetes

management by the people of Jammu & Kashmir. This study, therefore, presents new ethnomedicinal insights specific to the region.

3.3 Novelty of the Study

There is scarce information available on anti-diabetic uses of medicinal plants used by people in the urban areas of Jammu which makes this study a first ever investigation for further research to benefit the locals. The present study also provides anti-diabetic ethnomedicinal uses of eight plants viz., *Alstonia scholaris*, *Butea monosperma*, *Eucalyptus globulus*, *Hibiscus x rosa-sinensis*, *Ipomoea carnea*, *Kalanchoe pinnata*, *Monoon longifolium*, *Oxalis corniculata*, as novel additions to the ethnomedicinal data of Jammu & Kashmir. Although the anti-diabetic properties of these plants have been well established by researchers in other parts of the country, however, there are no previous reports of their usage against diabetes from Jammu & Kashmir. Hence, these findings represent a significant and novel addition to the ethnobotanical knowledge of the region.

4. CONCLUSION

The present study highlights the rich ethnomedicinal knowledge of urban communities in Jammu district regarding the use of plant species for diabetes management. The findings of this study underscore the importance of preserving and further exploring traditional plant-based remedies in the management of diabetes and other diseases as well. Given the growing threat of habitat destruction and urbanization, urgent conservation efforts and scientific validation of these medicinal plants are essential for integrating traditional knowledge into modern healthcare practices.

CONSENT

As per international standards or university standards, Participants' written consent has been collected and preserved by the author(s).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Abdelaali, B., Taha, D., Hannou, Z., Hamri, E., Ayoub, N. E. M., Bouyahya, A., & Mubarak, M. S. (2023). Bioactive Compounds 31 and Antidiabetic and Other Health Benefits of *Eucalyptus globulus*. Antidiabetic Medicinal Plants and Herbal Treatments, 469.
- Ahmed, F., Siddaraju, N. S., Harish, M., & Urooj, A. (2012). Effect of *Butea monosperma* Lam. leaves and bark extracts on blood glucose in streptozotocin-induced severely diabetic rats. Pharmacognosy research, 4(1), 33.
- Ajaz, T., & Ahmed, S. (2017). Ethnomedicinal plants recorded from Poonch district of J&K State (India). Journal of Pharmacognosy and Phytochemistry, 6(1), 405-410.
- Akhtar, M. S., & Bano, H. (2002). Hypoglycaemic Effect of Powdered *Alstonia Scholaris* (Satona). The Professional Medical Journal, 9(03), 268-271.
- Asadi-Samani, M., Moradi, M. T., Mahmoodnia, L., Alaei, S., Asadi-Samani, F., & Luther, T. (2017). Traditional uses of medicinal plants to prevent and treat diabetes; an updated review of ethnobotanical studies in Iran. Journal of nephropathology, 6(3), 118.
- Banik, G., Bawari, M., Choudhury, M. D., Choudhury, S., & Sharma, G. D. (2010). Some anti-diabetic plants of Southern Assam. Assam University Journal of Science and Technology, 5(1), 114-119.
- Begum, S., Hussain, S., Mehmood, A., Ahmad, K. S., & Hamid, A. (2018). Harnessing the potential of medicinal plants used for the treatment of diabetes in rural areas of Azad Jammu and Kashmir, Pakistan. Applied Ecology & Environmental Research, 16(5).
- Bhatia, H., Sharma, Y. P., Manhas, R. K., & Kumar, K. (2014). Ethnomedicinal plants used by the villagers of district Udhampur, J&K, India. Journal of ethnopharmacology, 151(2), 1005-1018.
- Bisht, D., Prakash, D., Kumar, R., Shakya, A. K., & Shrivastava, S. (2024). Phytochemical profiling and nephroprotective potential of ethanolic leaf extract of *Polyalthia longifolia* against cisplatin-induced oxidative stress in rat model. Journal of Ethnopharmacology, 326, 117922.
- Das, J., Acharya, B. C., & Mallick, S. N. (2023). Traditional ethno-medicinal plants used for treatment of diabetes by Bhuyan tribes in Sundargarh District of Odisha, India-an ethnobotanical survey. Plant Sci. Today, 10, 58-67.
- Das, J., Acharya, B. C., & Mallick, S. N. (2023). Traditional ethno-medicinal plants used for treatment of diabetes by Bhuyan tribes in Sundargarh District of Odisha, India-an ethnobotanical survey. Plant Sci. Today, 10, 58-67.
- Dhar, U., & Kachroo, P. (1983). Alpine Flora of Kashmir Himalaya. Scientific Publishers, Jodhpur. Pp. 93
- Eddouks, M., Chattopadhyay, D., De Feo, V., & Cho, W. C. S. (2014). Medicinal plants in the prevention and treatment of chronic diseases 2013. Evidence-based Complementary and Alternative Medicine: eCAM, 2014, 180981.
- Gairola, S., Sharma, J., & Bedi, Y. S. (2014). A cross-cultural analysis of Jammu, Kashmir and Ladakh (India) medicinal plant use. Journal of Ethnopharmacology, 155(2), 925-986.
- Gudavalli, D., Pandey, K., Ede, V. G., Sable, D., Ghagare, A. S., & Kate, A. S. (2024). Phytochemistry and pharmacological activities of five species of *Bauhinia* genus: A review. Fitoterapia, 174, 105830.
- Hossain, M. S., Jahan, I., Islam, M., Nayeem, J., Anzum, T. S., Afrin, N. A., ... & Hasan, M. K. (2024). *Coccinia grandis*: Phytochemistry, pharmacology and health benefits. Clinical Traditional Medicine and Pharmacology, 5(2), 200150.
- Kachroo, P., Sapru, B.L., & Dhar, U. (1977). Flora of Ladakh: an ecological and taxonomical appraisal. Bishen Singh Mahendra Pal Singh, Cannaught Place, Dehradun. Pp. 73
- Khan, J.A., & Paul, R. (2017). Folk medicinal plants used on diabetes and blood purification in Poonch district of Jammu

- and Kashmir North West Himalaya India. Asian Journal of Agriculture & Life Sciences. 2: 1-5.
- Lima, V. C., Cavalieri, G. C., Lima, M. C., Nazario, N. O., & Lima, G. C. (2016). Risk factors for diabetic retinopathy: a case-control study. International journal of retina and vitreous, 2, 1-7.
- Malaysia Sabah, K. K. (2023). A Review of Antidiabetic Activity of *Bauhinia purpurea* plant and its Phytochemical Constituents. Asian Journal of Medicine and Health Sciences Vol, 6(2), 52.
- Mirhoseini, M., Baradaran, A., & Rafieian-Kopaei, M. (2013). Medicinal plants, diabetes mellitus and urgent needs. J Herb Med Pharmacol, 2(2), 53-54.
- Mishra, J., Mahalik, G., & Parida, S. (2019). Ethnobotanical study of traditional medicinal plants used in the management of diabetes in the urban areas of Khurda, Odisha, India. Asian J Pharm Clin Res, 12(9), 73-78.
- Nagarathna, R., Tyagi, R., Battu, P., Singh, A., Anand, A., & Nagendra, H. R. (2020). Assessment of risk of diabetes by using Indian Diabetic risk score (IDRS) in Indian population. Diabetes research and clinical practice, 162, 108088.
- Naini, V., & Mamidala, E. (2013). An ethnobotanical study of plants used for the treatment of diabetes in the Warangal district, Andhra Pradesh, India. Biolife, 1(1), 24-28.
- Neamsuvan, O., Madeebing, N., Mah, L., & Lateh, W. (2015). A survey of medicinal plants for diabetes treating from Chana and Nathawee district, Songkhla province, Thailand. Journal of ethnopharmacology, 174, 82-90.
- Padhi, S., Nayak, A. K., & Behera, A. (2020). Type II diabetes mellitus: a review on recent drug-based therapeutics. Biomedicine & Pharmacotherapy, 131, 110708.
- Parasher, M., Pandey, D. K., & Manhas, R. K. (2024). Traditionally used anti-diabetic plants in Kathua district of Union Territory of Jammu and Kashmir, India. Journal of Ethnopharmacology, 319, 117087.
- Parasuraman, S., Thing, G. S., & Dhanaraj, S. A. (2014). Polyherbal formulation: Concept of ayurveda. Pharmacognosy reviews, 8(16), 73.
- Patil, R., Patil, R., Ahirwar, B., & Ahirwar, D. (2011). Current status of Indian medicinal plants with antidiabetic potential: a review. Asian Pacific Journal of Tropical Biomedicine, 1(2), S291-S298.
- POWO. 2025. "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; <https://powo.science.kew.org/> Retrieved 04 January 2025."
- Rahmatullah, M., Ferdausi, D., Mollik, M. A. H., Azam, M. N. K., Rahman, M. T., & Jahan, R. (2009). Ethnomedicinal survey of Bheramara area in Kushtia district, Bangladesh. American Eurasian Journal of Sustainable Agriculture, 3(3), 534-541.
- Raj, A., Gururaja, M. P., Joshi, H., & Shastry, C. S. (2014). *Kalanchoe pinnatum* in treatment of gallstones: An ethnopharmacological review. International Journal of Pharm Tech Research, 6(1), 252-261.
- Rani, V., Gupta, A., Megha, Awasthi, S., Suneja, T., Yadav, M., & Verma, S. (2020). Antidiabetic Activity of Indian Medicinal Plants. Herbal Medicine in India: Indigenous Knowledge, Practice, Innovation and its Value, 155-174.
- Rao, P. K., Hasan, S. S., Bhellum, B. L., & Manhas, R. K. (2015). Ethnomedicinal plants of Kathua district, J&K, India. Journal of ethnopharmacology, 171, 12-27.
- Revathi, G., Elavarasi, S., Saravanan, K., & Bahadur, B. (2017). Traditional use of herbal plants for the treatment of diabetes in India. Ethnobotany of India, North East India, Andaman and Nicobar Islands, 3.
- Rizvi, S. I., & Mishra, N. (2013). Traditional Indian medicines used for the management of diabetes mellitus. Journal of diabetes research, 2013(1), 712092.
- Ryakala, V. K., Ali, S. S., Sharanabasava, H., Hasin, N., Sharma, P., & Bora, U. (2010). Ethnobotany of plants used to cure diabetes by the people of north east India. Medicinal and aromatic plant science and biotechnology, 4(1), 64-68.
- Saleem, H., Ahmed, R., Mushtaq, S., Saleem, S., & Rajesh, M. (2024). Remote sensing-based analysis of land use, land cover, and land surface temperature changes in Jammu District, India. International Journal of River Basin Management, 1-16.
- Shah, A., Bharati, K. A., Ahmad, J., & Sharma, M. P. (2015). New ethnomedicinal claims from Gujjar and Bakerwals tribes of Rajouri and Poonch districts of Jammu and Kashmir, India. Journal of ethnopharmacology, 166, 119-128.

- Sharma, B. M., & Kachroo, P. (1981). Flora of Jammu and plants of neighbourhood. Bishen Singh Mahendra Pal Singh, Cannaught Place, Dehradun. Pp.135
- Singh, G., Passari, A. K., Momin, M. D., Ravi, S., Singh, B. P., & Kumar, N. S. (2020). Ethnobotanical survey of medicinal plants used in the management of cancer and diabetes. Journal of Traditional Chinese Medicine, 40(6).
- Singh, J.B., & Kachroo, P. (1994). Forest flora of Pir Panjal Range (Northwestern Himalaya). Bishen Singh Mahendra Pal Singh.
- Singh, P., Chandana, J. M., & Chandraprakash, K. (2023). Traditional Knowledge of Plants Used for the Treatment of Diabetes in Telangana, India: A Comprehensive Review. Journal of Ayurvedic and Herbal Medicine, 9(3), 138-150.
- Somani, R., Kasture, S., & Singhai, A. K. (2006). Antidiabetic potential of *Butea monosperma* in rats. Fitoterapia, 77(2), 86-90.
- Suji, G., & Sivakami, S. (2003). Approaches to the treatment of diabetes mellitus: an overview. Cellular and molecular biology (Noisy-le-Grand, France), 49(4), 635-639.
- Swami, A. & Gupta B.K. (1998). Flora of Udhampur. Bishen Singh Mahendra Pal Singh, Cannaught Place, Dehradun.
- Swanston-Flatt, S. K., Day, C., Bailey, C. J., & Flatt, P. R. (1989). Evaluation of traditional plant treatments for diabetes: studies in streptozotocin diabetic mice. Acta diabetologica latina, 26, 51-55.
- Talubmook, C., & Buddhakala, N. (2012). Antioxidant and antidiabetic activities of flower extract from *Butea monosperma* (Lam.) Taub. GSTF International Journal on Bioformatics & Biotechnology (JBio), 2(1), 7.
- Thirumalai, T., Beverly, C. D., Sathiyaraj, K., Senthilkumar, B., & David, E. (2012). Ethnobotanical Study of Anti-diabetic medicinal plants used by the local people in Javadhu hills Tamilnadu, India. Asian Pacific Journal of Tropical Biomedicine, 2(2), S910-S913.
- Vanita, K., & Sunita, V. (2018). Treatment of various diseases by *Canna indica* L.-a promising herb. Asian J Pharm Clin Res, 11(12), 51-56.

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