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Review Article

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"A Comprehensive Review on the Economic Importance, Medicinal Applications, and Bio-Resource Potential of *Pueraria tuberosa* Roxb. ex Willd. DC"

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Abstract

Pueraria tuberosa Roxb. ex Willd. DC, commonly known as Indian Kudzu, Vidarikanda, or Nelagummadi, is a deciduous, perennial, semi-woody climber with large tuberous roots and belongs to the family Papilionaceae. Traditionally recognized for its wide range of therapeutic applications, this plant plays a dual role in both the prevention and treatment of various ailments. A comprehensive understanding of its pharmacological and therapeutic properties is essential for its effective utilization.

This review presents a detailed evaluation of the phytochemical composition, antimicrobial activity, ethnobotanical relevance, phytotherapeutic potential, pharmacological properties, and economic significance of *Pueraria tuberosa*. Emphasis is placed on its role in traditional systems of medicine, especially Ayurveda, while incorporating recent scientific findings. The plant is noted for its high nutritional value and the presence of bioactive phytochemicals, which underscore the need for further scientific exploration to validate and expand its therapeutic applications.

This review aims to serve as a valuable resource for researchers and healthcare practitioners interested in exploring the medicinal and bio-resource potential of *Pueraria tuberosa*, encouraging future studies to uncover its unexplored benefits and applications.

Keywords: *Pueraria tuberosa*, Phytochemical, Phytotherapeutical, Pharmacological, anti-microbial activity and Ayurvedha.

1.1 Introduction:

Pueraria tuberosa (Roxb. ex Willd.) DC., a vital member of the Fabaceae family—also referred to as Papilionaceae or Leguminosaeis known for its wide-ranging ecological and economic importance. This large family includes plants that provide essential resources such as oil, fiber, fuelwood, green manure, fodder, timber, and numerous medicinal products, in addition to serving valuable roles in horticulture and soil fertility enhancement through nitrogen fixation (Lewis *et al.,* 2005). Fabaceae plants are prominent in agroforestry and sustainable agriculture systems due to their adaptability and multi-functional usage.

Pueraria tuberosa, commonly known as Indian Kudzu, is native to and widely distributed across tropical and subtropical regions, including India, Nepal, Pakistan, China, and Japan. The genus *Pueraria* consists of around 17 recognized species, most of which are found in Southeastern Asia, Malaysia, and the Western Pacific Islands (Starr *et al.,* 1999). The plant is a perennial, semi-woody, climbing vine with large tuberous roots that store nutrients and possess multiple pharmacological activities.

The introduction of Kudzu into various ecosystems has been noted for both ecological restoration and medicinal applications. As reported by Mitich (2000), its growth is highly dependent on geographical and climatic parameters. It thrives particularly well in lowland regions at altitudes up to 1000 meters, within a latitudinal range of 44°N to 30°N, but fails to grow in excessively moist or alkaline (high pH) environments. According to Fujita et al. (1991), the plant performs best under full sunlight, although it demonstrates some tolerance to shaded conditions, making it a hardy leguminous species in diverse ecological niches.

In the Indian context, *P. tuberosa* is considered one of the most valuable medicinal plants among the indigenous Kudzu species. It has a trailing and climbing habit, and its tubers are rich in starches, isoflavones, and other bioactive compounds. The five primary species in the *Pueraria* genus include *P. montana*, *P. lobata*, *P. edulis*, *P. phaseoloides*, and *P. thomsonii*. Interestingly, the names *P. thunbergiana* and *P. montana var. lobata* are considered synonymous with *P. tuberosa*, reflecting the taxonomical complexity of this group.

In India, the plant is commonly found at altitudes up to 1200 meters and is known by various vernacular names, such as Bilaikand, Vidarikand, and Glora-bel (NISCAIR, 2003). It has also been recorded growing at elevations as high as 4000 feet in the Himalayan ranges, showing its wide altitudinal adaptability. The tubers are palatable, sweet in taste (Ayurvedic Pharmacopoeia of India, 2001), and traditionally used in Ayurvedic and Unani systems of medicine.

Medicinally, *P. tuberosa* is valued for its rejuvenating and restorative properties. It has been employed in the treatment of a range of conditions including fever, menorrhagia, skin diseases, wounds, bronchial asthma, jaundice, and general weakness. The plant is known to contain compounds such as puerarin, daidzein, and genistein—bioactive isoflavones with antioxidant, cardioprotective, and anti-inflammatory properties. Its roots are also rich in starch and minerals, making it not only a medicinal plant but also a potential nutritional supplement in rural and tribal communities.

Thus, *Pueraria tuberosa* stands out as a multipurpose plant with high medicinal, ecological, and economic significance, deserving further phytochemical exploration and conservation efforts to support its sustainable use.

1.2 Economic and Ethnobotanical Importance of *Pueraria tuberosa*

Pueraria tuberosa is an economically significant species, primarily propagated through vegetative means such as runners that root at the nodes and through underground rhizomes. This efficient method of propagation allows the plant to spread rapidly and establish itself in diverse environments. Notably, *Pueraria* species are highly root-nodulated and contribute significantly to soil enrichment through biological nitrogen fixation, thus improving soil fertility and benefiting surrounding crops (Selvakumar *et al.,* 2008).

The stems of *P. tuberosa* contain a substantial amount of isoflavones—bioactive compounds typically associated with the roots. Research indicates that these stems contain isoflavones comparable to those in the roots, suggesting that they too could serve as an alternative commercial source of puerarin and related phytochemicals (Zeng *et al.,* 1999). This expands the usable parts of the plant beyond the tubers, offering greater economic utility in pharmaceutical and nutraceutical industries.

Ethnobotanically, the leaves of *P. tuberosa* are traditionally valued for their high vine content and are used as fodder for various grazing animals. In rural and tribal areas, the roots, flowers, and leaves are also used in the preparation of jelly and other dietary products (Li *et al.,* 2010), reflecting its nutritional and culinary significance.

Beyond food and fodder, *P. tuberosa* has been utilized in the fermentation industry for producing lysine-enriched baker's yeast and ethyl alcohol, underlining its industrial importance (Tanner *et al.,* 2008). Additionally, the plant is traditionally used in agriculture, food preservation, and herbal preparations. In Ayurvedic medicine, the tuber is highly regarded as a tonic and rejuvenating agent, and is employed in the treatment of fever, inflammation, reproductive disorders, and respiratory conditions.

Overall, *Pueraria tuberosa* is a multipurpose plant of great economic and ethnobotanical relevance. Its roles span from soil improvement and livestock feed to industrial applications and traditional healing practices, making it a valuable bio-resource in both local and commercial contexts.

1.3 Nutritional and Potential Values of *Pueraria tuberose*

Pueraria tuberosa is recognized for its substantial nutritional composition and potential as a valuable food and fodder source. The plant typically contains **15–18% crude protein** and over **60% total digestible nutrients**, making it suitable for use in animal feed and as a dietary supplement in resource-scarce regions. However, it is noted that the nutritional quality of the leaves declines when vine content increases disproportionately to leaf mass.

In the context of sustainable agriculture, *P. tuberosa* has attracted attention for its adaptability to challenging environmental conditions. Studies have demonstrated that the species exhibits improved water-use efficiency and enhanced salt tolerance, characteristics that are increasingly important for maintaining agricultural productivity under climate stress conditions (Gregory, 2004; Tuberosa, 2004). These traits make the plant suitable for cultivation in arid and semi-arid regions.

In addition, biological control research conducted by the Agricultural Research Service (ARS) in the United States has explored the use of the fungus *Myrothecium verrucaria* as a biologically based herbicide to manage invasive kudzu species, highlighting the plant's rapid spreading ability reportedly at a rate of 150,000 acres annually (Cain *et al.,* 2011). Though *P. tuberosa* itself is not considered invasive in India, its high growth rate and adaptability make it a suitable candidate for ecological restoration and biomass generation.(Table-1)

The nutritional profile of *P. tuberosa* has been quantified in several studies. According to Krishnamurthy et al. (2010), the tubers contain a rich composition of essential macronutrients and bioactive compounds, as shown below:

Table 1: The analysis of different nutritional values of *pueraria tuberosa* according to Krishnamurthy *et al*. (2010).

Nutrients	**% with mean ± S.E**
Ash	1.8±0.02
Protein	3.54±0.03
Crude fiber	5.0±0.03
Moisture	8.8±0.02
Fat	16.4±0.02
Carbohydrate	**64.46±0.02**

This nutrient-rich profile highlights the energy-dense and carbohydrate-rich nature of the tuber, supporting its use as a functional food in traditional medicine systems such as Ayurveda. Additionally, the presence of moderate protein and high fat content supports its potential in nutraceutical formulations.

Beyond macronutrients, *P. tuberosa* is known to possess a range of **bioactive compounds**, including isoflavones like puerarin, daidzein, and genistein, which are recognized for their antioxidant, anti-inflammatory, and hormone-regulating effects. These compounds contribute not only to the plant's therapeutic potential but also to its value in functional foods and dietary supplements.

Additional Potential Uses:

- As a natural thickening agent in traditional dishes and food preparations.
- As a starch source in pharmaceutical formulations and herbal pastes.
- In nutraceuticals, to promote strength and vitality, particularly in geriatric and reproductive health products.
- In diabetic diets, due to their slow-digesting carbohydrates and potential glycemic regulation.

Finally, *Pueraria tuberosa* stands out not only for its ecological and medicinal applications but also for its robust nutritional profile, justifying its inclusion in food security and health-based initiatives in both rural and commercial contexts.

1.4 Medicinal importance

Leguminous plants, including *Pueraria tuberosa*, have long been utilized in traditional and modern medicine for the treatment of various ailments such as malaria, fever, cancer, rheumatism, and diabetes. Their therapeutic potential is especially recognized in

indigenous knowledge systems, where local communities rely on medicinal plants for primary healthcare (Hodges & Bennett, 2006). Several legumes are valuable sources of bioactive compounds used in pharmaceutical industries, and *P. tuberosa* is among the most prominent in this regard.

Extracts of *P. tuberosa* and its purified phytochemicals have demonstrated promising antimicrobial properties, supporting their use in the development of natural therapeutic agents (Mahady, 2005). Traditionally known as Kudzu, the plant is widely used in the treatment of skin diseases, where it is believed to improve skin tone, reduce discoloration, and enhance skin glow. Its diuretic properties make it a common ingredient in Ayurvedic formulations prescribed for urinary disorders and fluid retention.
Pharmacologically, *P. tuberosa* has been shown to influence vascular smooth muscle tissue, playing a role in reducing cardiovascular risk factors and enhancing cerebrovascular fibrinolysis (Kashyap *et al.,* 2005). It has been used as an adjunct therapy in cardiovascular conditions (Luo *et al.,* 2010; Zhu *et al.,* 2010). Furthermore, its powdered root extracts are formulated into capsules for long-term management of diabetes mellitus (Kusano & Ferrari, 2008), and it is also employed in the treatment of renal and pulmonary conditions.

The medicinal value of *P. tuberosa* is attributed to its rich content of isoflavones and other phytochemicals such as puerarin, daidzein, and genistein, which are known for their antioxidant, anti-inflammatory, and hormone-modulating effects (Bhutani *et al.,* 1969; Verma *et al.,* 2009a; Pandey & Tripathi, 2010). These bioactive compounds contribute significantly to the plant's therapeutic versatility.

In traditional Ayurvedic medicine, *P. tuberosa* is frequently used in polyherbal formulations. It acts as a Rasayana (rejuvenator), helping to promote overall vitality and longevity. Some of the notable Ayurvedic preparations containing *P. tuberosa* include:

- **Ashwagandharishta** – a classical herbal tonic used in the management of neurological conditions like epilepsy and mental fatigue (Tanna *et al.,* 2012).
- **Maha Vishagarbha Taila** – an external oil preparation used to relieve pain in conditions like sciatica, arthritis, and muscular stiffness (Kumawat *et al.,* 2017).

The integration of *P. tuberosa* in these formulations highlights its synergistic role in enhancing the efficacy of other herbal constituents.(Table-2)

Table-2: Isoflavones and Phytochemicals Identified in *Pueraria tuberose*

Category	Compounds
Major Isoflavones	Puerarin, Puerarone, Daidzein, Genistin, Genistein
Tuber-Specific Compounds	Tuberosine, Puerarostan, 3-O-methylanhydro tuberosin
Phytosterols	β-sitosterol, Stigmosterol, Stigmasterol, Puerarosterol

1.5 Pharmacological and Therapeutic Significance of *Pueraria tuberose*

Kudzu (*Pueraria tuberosa*) exhibits a wide spectrum of pharmacological properties, making it a valuable medicinal plant in both traditional and modern healthcare systems. Numerous studies have confirmed its role in combating major diseases and supporting general health through bioactive phytoconstituents such as isoflavones, alkaloids, flavonoids, and tannins.

Anticancer and Anti-tumor Activities

Kudzu has shown promising **anticancer properties**, particularly against **breast, ovarian, and cervical cancers** (Adedapo *et al.,* 2017). It also exhibits **anti-tumor activity**, as demonstrated in various cell line studies (Jeon *et al.,* 2005). These effects are primarily attributed to its isoflavones, which interfere with cancer cell proliferation and metastasis.

Neurological and Reproductive Effects

Pharmacological investigations have revealed **anti-convulsant activity** (Basavaraj *et al.,* 2011), suggesting its potential in treating epilepsy and other neurological disorders. It also exhibits **anti-fertility properties** (Gupta *et al.,* 2005), making it relevant for fertility regulation. In traditional tribal medicine, *P. tuberosa* tuber and leaf extracts are used to treat **malaria fever**, **tuberculosis**, and **infertility** in both humans and animals. It is commonly administered as a **tonic** to boost strength and stamina.

Anti-inflammatory and Antioxidant Actions

The plant has potent **anti-inflammatory** (Tripathi *et al.,* 2013) and **antioxidant** properties (Pandey *et al.,* 2007), which contribute to its use in preventing oxidative stress-related disorders.

Table- 3 Other Documented Pharmacological Activities of *Pueraria tuberosa*

S. No.	Pharmacological Activity	Description / Benefit	Reference
1	Anti-stress	Reduces physical and psychological stress	Verma *et al.,* 2012
2	Anti-ulcerogenic	Prevents or heals gastric ulcers	Gindi *et al.,* 2010
3	Cardioprotective	Protects heart tissue and supports cardiovascular health	Patel *et al.,* 2018
4	Hypolipidemic	Reduces cholesterol and lipid levels	Tanwar *et al.,* 2008
5	Hepatoprotective	Protects liver from toxic damage	Xia *et al.,* 2013
6	Immunomodulatory	Enhances or regulates immune response	Patel *et al.,* 2016
7	Nephroprotective	Protects kidneys from toxins and oxidative stress	Shukla *et al.,* 2018b
8	Nootropic	Improves memory and cognitive function	Rao *et al.,* 2008
9	Neuroprotective	Prevents neurodegeneration and protects nerve cells	Xing *et al.,* 2011
10	Wound healing	Promotes skin regeneration and tissue repair	Kambhoja & Murthy, 2007

1.6 Other Documented Pharmacological Activities of *Pueraria tuberose*

Beyond its well-known applications in traditional medicine, *Pueraria tuberosa* has been scientifically validated for a broad range of pharmacological activities, reinforcing its significance as a multipurpose medicinal plant. Research has demonstrated its **anti-stress** potential, helping to alleviate physical and psychological stress, which is particularly beneficial in modern lifestyle-related disorders (Verma *et al.,* 2012). The plant also exhibits **anti-ulcerogenic** activity, effectively protecting the gastric mucosa and aiding in the management of peptic ulcers (Gindi *et al.,* 2010).(Table- 3)

Its **cardioprotective** properties have been highlighted in studies showing its ability to safeguard heart tissue and maintain cardiovascular health (Patel *et al.,* 2018). Additionally, *P. tuberosa* is recognized for its **hypolipidemic** effects, contributing to reduced lipid and cholesterol levels, thereby supporting cardiovascular wellness (Tanwar *et al.,* 2008).

The plant's role in liver protection is evident from its **hepatoprotective** potential, as it helps mitigate hepatic damage caused by toxins or stress (Xia *et al.,* 2013). As an **immunomodulatory** agent, it has shown promise in regulating and enhancing immune responses, which is particularly useful in managing infections and autoimmune conditions (Patel *et al.,* 2016).

Further, *P. tuberosa* has demonstrated **nephroprotective** activity by protecting kidney tissues from oxidative and chemical-induced injuries (Shukla *et al.,* 2018b). It also functions as a **nootropic** agent, improving memory, learning, and overall cognitive performance (Rao *et al.,* 2008), along with **neuroprotective** effects that prevent neurodegeneration and support nervous system health (Xing *et al.,* 2011).

Lastly, its effectiveness in **wound healing** has been reported, as it enhances tissue regeneration and accelerates the healing process of external wounds (Kambhoja & Murthy, 2007). These pharmacological

properties make *Pueraria tuberosa* a highly valuable resource in both traditional and contemporary medical research, warranting further investigation and therapeutic application.

These diverse activities support its use as a multifunctional herb in managing metabolic, cardiovascular, hepatic, renal, neurological, and inflammatory conditions.

1.7 Antimicrobial and Antifungal Properties

P. tuberosa has also demonstrated significant **antimicrobial activity**. According to Afolayan (2003), higher plants like *P. tuberosa* serve as potential sources for developing **novel antibiotics**. The plant has shown **antibacterial action** against **Salmonella paratyphi, Escherichia coli, and Staphylococcus aureus**, and **antifungal effects** against **Candida albicans**, particularly in methanolic tuber extracts, as observed in our investigations.

Additionally, *P. tuberosa* has exhibited **antitubercular activity** against *Mycobacterium tuberculosis*, particularly under high-concentration and prolonged treatment durations (Periyakaruppan *et al.,* 2012).

1.8 Clinical Observations and Safety

In a clinical study conducted on 38 military veterans, *Pueraria* extract showed **no adverse effects on drinking behavior or alcohol craving** after one month of use, indicating a favorable safety profile (Shebek *et al.,* 2000).

Finally, the comprehensive review by Maji et al. (2014) consolidated the **phytochemical richness** and **broad-spectrum therapeutic potential** of *P. tuberosa*, reinforcing its role as a pharmacologically important species in traditional and modern medicine. (Table-4)

Table 4: Pharmacological and Therapeutic Activities of *Pueraria tuberose*

S.No	Activity	Application / Target Disease	Reference(s)
1	Anticancer	Breast, ovarian, cervical cancers	Adedapo *et al.,* 2017
2	Anti-tumor	General tumor suppression	Jeon *et al.,* 2005
3	Anti-convulsant	Epilepsy and neurological disorders	Basavaraj *et al.,* 2011
4	Anti-fertility	Fertility control	Gupta *et al.,* 2005
5	Antimalarial, Anti-TB	Malaria fever, tuberculosis (tribal uses)	Present investigation
6	Tonic	General strength and infertility in humans and animals	Present investigation
7	Anti-inflammatory	Inflammation-related diseases	Tripathi *et al.,* 2013
8	Antioxidant	Oxidative stress disorders	Pandey *et al.,* 2007
9	Anti-stress	Stress relief and adaptation	Verma *et al.,* 2012
10	Anti-ulcerogenic	Gastric ulcers	Gindi *et al.,* 2010
11	Cardioprotective	Cardiovascular health	Patel *et al.,* 2018
12	Hypolipidemic	Cholesterol and lipid lowering	Tanwar *et al.,* 2008
13	Hepatoprotective	Liver protection	Xia *et al.,* 2013
14	Immunomodulatory	Immune system support	Patel *et al.,* 2016
15	Nephroprotective	Kidney protection	Shukla *et al.,* 2018b
16	Nootropic	Cognitive enhancement	Rao *et al.,* 2008
17	Neuroprotective	Nervous system protection	Xing *et al.,* 2011
18	Wound healing	Skin regeneration and healing	Kambhoja & Murthy, 2007
19	Antimicrobial	Against *S. paratyphi*, *E. coli*, *S. aureus*	Present study; Afolayan, 2003
20	Antifungal	Against *Candida albicans*	Present investigation
21	Anti-tubercular	*Mycobacterium tuberculosis*	Periyakaruppan *et al.,* 2012
22	Clinical safety	No adverse effect on alcohol craving in human study	Shebek *et al.,* 2000
23	Broad-spectrum potential	Comprehensive review of therapeutic and phytochemical profile	Maji *et al.,* 2014

1.9 Ethnomedicinal Importance of Fabaceae Family Plants

The Fabaceae (Leguminosae) family includes a wide variety of plants with significant ethnomedicinal importance, widely used by tribal and rural communities for treating diverse human and animal ailments. These plants are recognized for their therapeutic potential, and different parts such as roots, leaves, seeds, flowers, and whole plants are used for traditional remedies.

Butea monosperma, known for its vibrant flowers, is traditionally used for treating **diabetes and snake bites**, while *Clitoria ternatea*, often found in sacred groves, is used in managing **asthma** through its leaves, stem, and root. *Indigofera aspalathoides* is a well-known remedy for **cancer**, using its leaves and seeds, and *Teramnus labialis* roots are employed against **tuberculosis**. *Pueraria tuberosa*, a climbing herb with tuberous roots, is particularly effective in the treatment of **diabetes, cancer, cardiac ailments, and tuberculosis**, making it one of the most versatile medicinal legumes.

Pongamia pinnata roots are used for **snake bites**, while *Pterocarpus marsupium*, another medicinally rich species, is extensively utilized as a natural **anti-diabetic** agent. *Vigna mungo* (black gram) leaves and seeds are used in the treatment of **rheumatism**, and *Vigna trilobata* seeds are applied in traditional remedies for **rat bites**. *Crotalaria retusa* has cardioactive properties and is used for **cardiac disorders**.

Several other leguminous species also possess notable medicinal uses. For instance, *Abrus precatorius* seeds and roots are known for **antifertility, cough, and dermatological treatments**, while *Mucuna pruriens* is used for **Parkinson's disease, infertility, and as a nervine tonic**. *Dalbergia sissoo* bark and leaves aid in the healing of **bone fractures** and act as **anti-inflammatory agents**. The seeds and oil of *Arachis hypogaea* (groundnut) contribute to **cardiovascular and skin health**. *Cajanus cajan* is used for **jaundice, ulcers, and fever**, and *Sesbania grandiflora* for **cold, cough, and headaches**.

Furthermore, *Tephrosia purpurea* is applied in the treatment of **liver disorders, bronchitis, and leprosy**, and *Desmodium gangeticum* helps in managing **diarrhea, asthma, and fevers**. *Albizia lebbeck* is widely used for **respiratory issues and skin diseases**, and *Prosopis juliflora* bark and pods are traditional remedies for **wounds, diarrhea, and microbial infections**.

This wide ethnobotanical diversity within the Fabaceae family highlights its immense potential for the development of plant-based medicines and validates the traditional knowledge systems practiced by indigenous communities. Further pharmacological studies on these species can help establish new leads for modern therapeutic applications. (Table-5)

Table-5: Major important Indian Traditional Ayurvedic Medicinal Plants of Fabaceae (Leguminosae) family.

S. No.	Name of the Plant	Part Used	Treatment
1	*Butea monosperma*	Whole plant	Diabetes, snake bite
2	*Clitoria ternatea*	Leaves, stem, root	Asthma
3	*Indigofera aspalathoides*	Leaves, stem, seeds	Cancer
4	*Teramnus labialis*	Roots	Tuberculosis
5	*Pueraria tuberosa*	Tuber, leaves	Diabetes, cancer, cardiac issues, tuberculosis
6	*Pongamia pinnata*	Root	Snake bite
7	*Pterocarpus marsupium*	Whole plant	Anti-diabetic
8	*Vigna mungo*	Leaves, seeds	Rheumatism
9	*Vigna trilobata*	Seeds	Rat bite
10	*Crotalaria retusa*	Whole plant	Cardiac disorder
11	*Abrus precatorius*	Seeds, leaves, root	Antifertility, cough, skin diseases
12	*Mucuna pruriens*	Seeds, pods, root	Parkinsonism, infertility, nervine tonic
13	*Dalbergia sissoo*	Bark, leaves	Bone fractures, anti-inflammatory
14	*Arachis hypogaea* (Groundnut)	Seeds, oil	Heart health, skin nourishment

15	*Cajanus cajan* (Pigeon pea)	Leaves, roots, seeds	Jaundice, ulcers, fevers
16	*Sesbania grandiflora*	Flowers, leaves	Cold, cough, headache
17	*Tephrosia purpurea*	Whole plant	Liver disorders, bronchitis, leprosy
18	*Desmodium gangeticum*	Whole plant	Diarrhea, asthma, fever
19	*Albizia lebbeck*	Bark, leaves, flowers	Respiratory ailments, skin diseases
20	*Prosopis juliflora*	Bark, pods	Diarrhea, wounds, antimicrobial

Conclusion

The traditional use of medicinal plants in Indian Ayurveda has a long-standing legacy, with a majority of the population historically depending on plant-based remedies for the treatment and prevention of various diseases. However, in recent years, there has been a shift toward synthetic medications. This transition, coupled with the growing global issue of antibiotic resistance and the adverse side effects of many synthetic drugs, has raised serious public health concerns.

The increasing global prevalence of non-communicable diseases such as diabetes, cancer, obesity, hypertension, and neurodegenerative disorders further underscores the urgent need for safer and more effective treatment alternatives. In this context, medicinal plants offer a promising solution due to their natural origin, therapeutic efficacy, and minimal side effects.

This review specifically focused on the medicinal and pharmacological potential of Pueraria tuberosa Roxb., a valuable plant in traditional medicine. Rich in antioxidants, isoflavonoids, and other bioactive compounds, P. tuberosa has demonstrated potential in combating a variety of health disorders including diabetes, cancer, tuberculosis, cardiovascular diseases, and neurological conditions. Its wide therapeutic scope highlights its relevance as a potential source for the development of natural, plant-based treatments that could complement or replace current synthetic drugs. Further scientific validation and clinical exploration of this plant may contribute significantly to global healthcare strategies aimed at addressing chronic and lifestyle-related diseases.

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