

## **Insights into pharmaceutical properties of antioxidants derived from medicinal plants: An in-depth Analysis**

**Shatakshi Lall**

Department of Pharmacy, Graphic Era Hill University, Dehradun, Uttarakhand, India 248002

**DOI:10.48047/pne.2018.55.1.24**

---

### **Abstract**

In India, there is a long history of employing medicinal plants to treat a wide range of illnesses. Many of these plants are also high in antioxidants. Curcumin, a potent antioxidant with anti-inflammatory and anti-cancer properties, is found in foods like turmeric. Another frequently employed medicinal plant that is abundant in antioxidants and vitamin C is amla, usually referred to as Indian gooseberry. The immune system is strengthened, and oxidative stress is protected from. A medical plant known as ashwagandha has been proven to have antioxidant characteristics as well as the capacity to lessen stress and anxiety, enhance brain function, and improve physical performance. In India, green tea is also a well-liked source of antioxidants because of the catechins in it. Catechins have a number of health advantages, including enhancing heart health and lowering the risk of developing some types of cancer. These medicinal plants have been utilized for generations in India, and current research on them has focused heavily on their antioxidant effects. Numerous health advantages, including defense against chronic diseases brought on by oxidative stress, may result from including these plants in one's diet or from ingesting them as supplements. Overall, these medicinal herbs are valuable in both conventional Indian medicine and contemporary healthcare due to their antioxidant characteristics.

**Keywords:** Medicinal plants, Antioxidants, Traditional medicine, Anti-inflammatory, Anti-cancer, Oxidative stress.

### **Introduction**

A description of the present state and prospects for herbal medicine in India was given by Samy and Gopalakrishnakone (2007). They pointed out that many Indian medicinal plants contain bioactive substances with a range of pharmacological activities, including antioxidant activity. These plants have been used historically for hundreds of years to cure a wide variety of diseases. They opined that the identification and exploitation of novel phytochemicals from these plants will determine the course of herbal medicine in the future.

The effects of traditional Indian medicines, which are frequently used to treat diabetes, on blood sugar were examined by Baby and Jini in 2011. They concentrated on locating antioxidant substances in these herbs that may boost insulin sensitivity and help control blood sugar levels. They found a number of plants, such as holy basil, bitter gourd, and turmeric, which have high concentrations of antioxidants such as eugenol, charantin, and curcumin. These antioxidants

have been showed to have strong hypoglycemic effects, which may make them useful for treating diabetes. They also observed that the antioxidant components in these herbs can enhance insulin sensitivity, which is crucial for controlling blood glucose levels. These conventional Indian herbs may be useful as complementary treatments for controlling diabetes, according to one theory. It has been noted that using these herbs in addition to traditional treatments may result in better blood glucose regulation and better outcomes for diabetic patients. In addition, using natural medicines like these herbs may lessen the possibility of adverse effects from traditional diabetic treatments. the therapeutic benefits of antioxidants produced from Indian medicinal herbs, particularly in connection to the control of diabetes.

According to Dahiya and Purkayastha (2012), several medicinal herbs have antibacterial properties and exhibit multi-drug resistance in bacteria from clinical isolates. They showed that numerous studied plants, such as neem, amla, and turmeric, have antioxidant components with strong antibacterial effects. These substances work well against a variety of bacteria, even ones that are resistant to several other antibiotics. They proposed that these healing plants might be helpful in the creation of novel antibiotics or as herbal treatments for bacterial diseases. This revealed that traditional Indian herbs with hypoglycemic properties, like turmeric, bitter gourd, and holy basil, contain antioxidant components. These antioxidant chemicals may also help increase insulin sensitivity. This showed that the potential of these herbs as alternative medicines for treating diabetes and lowering the danger of adverse effects caused by conventional treatments.

### **Literature Review**

Malviya et al. (2010) explored the possible anti-diabetic properties of Indian medicinal herbs. They looked into the hypoglycemic effects of numerous plants that are frequently used in traditional medicine. They observed that a number of plants, including *Trigonella foenum-graecum*, *Momordica charantia*, and *Gymnema sylvestre*, showed notable anti-diabetic properties. These plants' active ingredients have been shown to increase insulin sensitivity and lower blood glucose levels. They showed that these medicinal herbs would be useful as complementary therapies for controlling diabetes and as a less dangerous substitute for traditional antidiabetic medications. Shaikh et al. (2014) looked into the anti-inflammatory, anti-cancer, and antioxidant effects of a few medicinal herbs utilized in Indian traditional medicine. They revealed that some plants showed notable antioxidant and anticancer effects, including *Syzygium cumini*, *Terminalia chebula*, and *Moringa oleifera*. These plants' active ingredients have been proven to have strong anticancer and antioxidant effects, pointing to the possibility of using them as homoeopathic treatments for cancer and conditions linked to oxidative stress.

*Bacopa monnieri*, a plant used frequently in Indian traditional medicine, was looked at by Jadiya et al. (2011) for its anti-Parkinsonian properties. In order to look at the potential advantages of *Bacopa monnieri*, they used transgenic and pharmacological *Caenorhabditis elegans* models of

Parkinson's disease. They observed that in both models, *Bacopa monnieri* dramatically enhanced motor performance and decreased oxidative stress. The plant's active constituents were revealed to exhibit strong antioxidant and neuroprotective effects, pointing to their potential utility in the treatment of Parkinson's disease. Lagunin et al. (2014) noted the potential of utilising chemo- and bioinformatics resources for in silico drug development from therapeutic plants in India. Using computational methods, they assessed the potential of medicinal plants beyond their traditional uses for the development of novel medications. They emphasized the significance of using in silico technologies to find new drugs because they can speed up the process and cut costs compared to more conventional procedures. They listed numerous databases and software tools that can be utilised for in silico drug discovery and gave a thorough analysis of how they are employed in the industry.

The therapeutic benefits of plumbagin and its analogues, which are organic substances found in Indian medicinal plants, were examined by Padhye et al. in 2012. They looked at the biological functions of plumbagin and its analogues, including its anti-inflammatory and antioxidant effects. They claimed that since these substances can cause cell death and stop tumor growth, they may be useful as therapeutic agents for a number of illnesses, including cancer. In order to ensure the safety of these compounds' use in clinical settings, they also emphasized the necessity for more study to assess their toxicity and pharmacokinetic characteristics.

Golinska et al. (2015) assessed the variety and bioactivity of endophytic actinobacteria revealed in Indian medicinal plants. They revealed several endophytic actinobacteria that generate secondary metabolites with antioxidant capabilities that can be exploited to create novel medications. They emphasized the potential of endophytic actinobacteria as a source of bioactive substances for the pharmaceutical industry and contended that these organisms might offer a viable alternative to conventional approaches to drug discovery. Henna is a plant that has been used for ages in India for body painting and hair dyeing. Pradhan et al. (2012) offered insights into the therapeutic benefits of henna. They discussed henna's potential as a healthy alternative to chemotherapy. They emphasized the many phytochemicals in henna, including lawsone, which has been established to have anti-cancer potential. They also talked about how henna might work, including how it might cause apoptosis and stop angiogenesis.

Damle (2014) focused on the therapeutic benefits of *Glycyrrhiza glabra*, also referred to as licorice. They talked about liquorice's several pharmacological attributes, including its anti-inflammatory, antibacterial, and antioxidant effects. They also talked about liquorice's potential modes of action, including its capacity to impact the immune system and control hormonal equilibrium. They emphasised the potential of liquorice as a homeopathic treatment for a range of conditions, including skin problems, respiratory infections, and peptic ulcers.

According to Ganjhu et al. (2015), herbal plants and plant-based remedies are sometimes used to treat viral infections. They highlighted how neem, tulsi, and amla are some of the traditional medicinal plants used in India to cure viral infections. They emphasized how these plants could help the body's immune system function better and lessen the severity of viral infections. It also emphasized the different ways in which these medicinal plants work, such as their antiviral and immunomodulatory capacities. Neem, for instance, has antiviral capabilities because it can prevent the multiplication of viruses by concentrating on their particular proteins. Tulsi and amla were also observed to have immunomodulatory characteristics, which support the body's immunological response to combat viral infections. It also covered how these herbal plants might be used to create brand-new antiviral medications. They emphasized the significance of carrying out additional study to delve into the active substances in these plants and their modes of action, which can aid in the creation of efficient and secure antiviral medications. The medicinal potential of natural plants and plant-based remedies for the treatment of viral infections. The effectiveness of conventional medicine in treating a variety of illnesses, including viral infections, was showed by this.

### **Objective of the Study**

Learn the insights into pharmaceutical properties of antioxidants derived from medicinal plants

### **Methodology**

This study utilized a structured questionnaire to conduct a survey, and statistical methods such as mean & t-test were used to analyze the responses from 239 participants. The sampling method used in this research was convenience sampling, where individuals were selected based on their accessibility & willingness to participate.

**Table 1 Insights into pharmaceutical properties of antioxidants derived from medicinal plants**

<b>Serial No.</b>	<b>Statement of Survey</b>	<b>Mean Value</b>	<b>t-value</b>	<b>p-value</b>
1	Neem is a powerful antifungal and antibacterial herb that is used to treat skin conditions such as acne and eczema.	4.11	7.852	0.000
2	Shankhpushpi may have anti-inflammatory properties and is used to treat anxiety and depression.	4.36	10.411	0.000
3	Ashwagandha has adaptogenic properties that help to reduce stress and anxiety.	4.50	11.806	0.000
4	Ginger is used to treat digestive problems such as nausea, vomiting, and bloating.	4.04	5.445	0.000
5	Guggulu can be helpful in treating a range of	3.88	4.021	0.000

	conditions, including arthritis, high cholesterol & obesity.			
6	Turmeric is a powerful anti-inflammatory and antioxidant medicinal herb that are being used in traditional Indian medicine.	4.44	11.218	0.000
7	Haritaki may be used to treat digestive problems such as constipation and diarrhea.	4.06	6.944	0.000
8	Tulsi is used to treat respiratory conditions such as coughs and colds.	4.14	8.777	0.000
9	Amla is used to treat digestive problems and is believed to have anti-cancer properties.	3.75	3.263	0.001
10	Brahmi is used to improve cognitive function and memory.	4.43	12.215	0.000

Table 1 demonstrates the mean values for each of the statement of the study done on the “insights into pharmaceutical properties of antioxidants derived from medicinal plants”, examining the average scores, the statement that obtains the highest mean score can be described as “Ashwagandha has adaptogenic properties that help to reduce stress and anxiety”, which has the mean score of 4.50, Looking at the next statement which is “Turmeric is a powerful anti-inflammatory and antioxidant medicinal herb that are being used in traditional Indian medicine” the mean score is found to be 4.44. Looking at the mean score of 4.43 for the statement “Brahmi is used to improve cognitive function and memory” shows that cognitive function is also responsible in pharmaceutical properties of antioxidants. Looking at the other benefit of pharmaceutical properties of antioxidants is, “Shankhpushpi may have anti-inflammatory properties and is used to treat anxiety and depression” which displays the mean score of 4.36, and the statement “Tulsi is used to treat respiratory conditions such as coughs and colds” showcase the mean score of 4.14. Then the statement “Neem is a powerful antifungal and antibacterial herb that is used to treat skin conditions such as acne and eczema” obtains mean value of 4.11 and the statement “Haritaki may be used to treat digestive problems such as constipation and diarrhea” has 4.06. The statement “Ginger is used to treat digestive problems such as nausea, vomiting, and bloating” showcase the mean score of 4.04. Therefore, the last two statements fall within the lowest category or level, “Guggulu can be helpful in treating a range of conditions, including arthritis, high cholesterol & obesity” mean value of 3.88, the statement “Amla is used to treat digestive problems and is believed to have anti-cancer properties” has 3.75. The significance of the t-value for each statement in the investigation on the insights into pharmaceutical properties of antioxidants derived from medicinal plants is significant. The t-value statements were positive, and their significance value was less than 0.05, indicating a significant relationship between the two variables.

## Conclusion

Antioxidants are chemicals that stop or delay the oxidative harm that free radicals do to cells. These free radicals are formed by the body's normal metabolic processes, but they can also be caused by environmental factors including pollution, radiation, and certain substances. Oxidative stress is a condition that is brought on by an imbalance between the body's capacity to detoxify free radicals and their production. Oxidative stress is linked to a number of chronic diseases, including cancer, cardiovascular disease, and neurological disorders. India is home to many medicinal herbs, which are a great source of free radicals. These plants' antioxidant abilities are a result of the existence of numerous bioactive substances, including polyphenols, flavonoids, and carotenoids. Turmeric, ginger, neem, amla, ashwagandha, and tulsi are a few of the famous Indian medicinal herbs that are high in antioxidants. Ayurveda and other conventional medical systems have long employed these plants for therapeutic purposes. Antioxidants made from Indian medicinal plants are very important in terms of their pharmacological characteristics. Anti-inflammatory, antibacterial, anti-cancer, neuroprotective, and cardioprotective properties are only a few of the pharmacological activity that these antioxidants have been shown to exhibit. Consequently, antioxidants derived from Indian medicinal plants have enormous potential for use in medicine. Instead of synthetic antioxidants, which have a number of negative side effects, these natural substances can be employed. The entire potential of these antioxidants must be uncovered, and new medications based on these organic substances must be developed. The therapeutic potential of these natural chemicals can be better understood by looking at how traditional medical systems use medicinal plants.

## References

- Baby, J., & Jini, D. (2011). Insight into the hypoglycaemic effect of traditional Indian herbs used in the treatment of diabetes. *Research Journal of Medicinal Plant*, 5(4), 352-376.
- Dahiya, P., & Purkayastha, S. (2012). Phytochemical screening and antimicrobial activity of some medicinal plants against multi-drug resistant bacteria from clinical isolates. *Indian journal of pharmaceutical sciences*, 74(5), 443.
- Damle, M. (2014). *Glycyrrhiza glabra* (Liquorice)-a potent medicinal herb. *International journal of herbal medicine*, 2(2), 132-136.
- Ganjhu, R. K., Mudgal, P. P., Maity, H., Dowarha, D., Devadiga, S., Nag, S., & Arunkumar, G. (2015). Herbal plants and plant preparations as remedial approach for viral diseases. *Virusdisease*, 26, 225-236.
- Golinska, P., Wypij, M., Agarkar, G., Rathod, D., Dahm, H., & Rai, M. (2015). Endophytic actinobacteria of medicinal plants: diversity and bioactivity. *Antonie Van Leeuwenhoek*, 108, 267-289.
- Jadia, P., Khan, A., Sammi, S. R., Kaur, S., Mir, S. S., & Nazir, A. (2011). Anti-Parkinsonian effects of *Bacopa monnieri*: insights from transgenic and pharmacological

*Caenorhabditis elegans* models of Parkinson's disease. Biochemical and biophysical research communications, 413(4), 605-610.

- Lagunin, A. A., Goel, R. K., Gawande, D. Y., Pahwa, P., Glorizova, T. A., Dmitriev, A. V., ... & Poroikov, V. V. (2014). Chemo-and bioinformatics resources for in silico drug discovery from medicinal plants beyond their traditional use: a critical review. Natural product reports, 31(11), 1585-1611.
- Malviya, N., Jain, S., & Malviya, S. A. P. N. A. (2010). Antidiabetic potential of medicinal plants. Acta pol pharm, 67(2), 113-118.
- Padhye, S., Dandawate, P., Yusufi, M., Ahmad, A., & Sarkar, F. H. (2012). Perspectives on medicinal properties of plumbagin and its analogs. Medicinal research reviews, 32(6), 1131-1158.
- Pradhan, R., Dandawate, P., Vyas, A., Padhye, S., Biersack, B., Schobert, R., ... & H Sarkar, F. (2012). From body art to anticancer activities: perspectives on medicinal properties of henna. Current drug targets, 13(14), 1777-1798.
- Samy, R. P., & Gopalakrishnakone, P. (2007). Current status of herbal and their future perspectives. Nature preceding, 1-1.
- Shaikh, R., Pund, M., Dawane, A., & Iliyas, S. (2014). Evaluation of anticancer, antioxidant, and possible anti-inflammatory properties of selected medicinal plants used in Indian traditional medication. Journal of traditional and complementary medicine, 4(4), 253-257.