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Botanical And Phytochemical Investigation Of Therapeutically Important Medicinal Plants

Dr. Rajesh Kumar Patel

Department – Botany, Designation - Guest lecturer, Kg. arts and science college Raigarh(c.g.), S.n.p.v. Raigarh (c.g.)

Email id raj9424168929@gmail.com

ABSTRACT

The medicinal and pharmacological properties of plants have made them useful in both conventional and alternative medicine. The present study was carried out on the botanical and phytochemical study of selected medicinal plants Neem, Tulsi, Aloe vera, Turmeric and Ashwagandha. The study was conducted for identification, authentication of medicinal plants species and Phytochemical screening for important bioactive compounds. Phytochemical screening found phenolic chemicals, glycosides, alkaloids, flavonoids, tannins, terpenoids, and saponins; botanical examination confirmed the plants' authenticity and categorisation. These phytochemicals have been linked to beneficial therapeutic functions like antioxidant, antimicrobial, anti-inflammatory, and antidiabetic properties. The results provided the basis for the importance of the selected plants in medicine and also indicated their use in medicine and pharmaceutical research. The research concluded that medicinal plants have a wide variety of phytochemicals and a lot of untapped therapeutic potential. Proper botanical authentication and phytochemical evaluation are vital for assuring the purity, safety, and efficacy of medical plant-based products.

Keywords: Medicinal Plants, Phytochemical Screening, Herbal Medicine, Bioactive Compounds, Botanical Investigation

1. INTRODUCTION

Medicinal plants continue to play a significant role in healthcare systems worldwide, having been utilised as natural cures for illness prevention and treatment since ancient times (Achimugu, 2022). In the past, several plant-based medications were employed for health and healing in traditional medicinal systems such as Ayurvedic, Unani, Siddha, and Traditional Chinese Medicine (Anil & Talluri, 2021). Herbal remedies continue to play an important role in modern medicine as main care therapies due to its accessibility, low cost, and lack of side effects compared to synthetic pharmaceuticals (Patel, 2025). The World Health Organization reports that medicinal plants remain a major source of therapeutic substances, particularly in underdeveloped countries where traditional medicine is widely used in healthcare (WHO) (Patel & Bharti, 2025).

The rising need for all-natural goods and worries about the side effects of synthetic pharmaceuticals have piqued the scientific community's interest in medicinal plants (Awuchi, 2019). The phytochemicals found in medicinal plants are very diverse and can have various medicinal effects. Phytochemicals found here include steroids, glycosides, phenolic compounds, alkaloids, flavonoids, tannins, terpenoids, and saponins (Patel, 2025). Their useful

pharmacological effects include protecting the liver, fighting cancer, reducing inflammation, antidiabetic, antibacterial, and immunomodulatory effects (Patel, 2026). The medical properties of plants have made them an important ingredient in modern pharmaceuticals, nutraceuticals, and drug research (Bhat, 2021).

The identification, authentication, and evaluation of medicinal plants for both traditional and modern medicine rely heavily on botanical and phytochemical studies (Gupta & Deogade, 2018). Understanding the therapeutic potential of plants and developing safe and effective herbal medications are both aided by evaluating their scientific features. Medical plant resources can be better conserved, standardised, and subjected to quality control thanks to these studies (Patel & Bharti, 2025).

1.1 Botanical Importance of Medicinal Plants

To properly identify, categorise, authenticate, and standardise therapeutic plants, botanical study is a crucial tool. Herbal medications rely on accurate botanical characterisation to guarantee their quality, safety, and effectiveness (Kaushik et al., 2021). This is because it checks that the species used to make the treatment is the correct one, and not a hybrid or fake. Leaf shape, stem structure, root system, flower arrangement, seed morphology, and environmental factors are just few of the morphological, anatomical, and taxonomic aspects that are investigated in botanical studies (Patel et al., 2025). For accurate plant identification and documentation in science, these are some of the most important characteristics to look for. The growth and medicinal value of plants are highly influenced by environmental factors like climate, soil type, geographical location, altitude and rainfall etc (Patel, 2026). Changes in these conditions can have an impact on the amount and types of phytochemicals found in medicinal plants. Thus, botanical investigation plays a crucial role not only in its identification, but also in recognizing ecological adaptations and standardization of herbal drug preparation. Moreover, proper botanical authentication helps to prevent the wrong use of plant material and to conserve valuable medicinal plant species.

1.2 Phytochemical Significance and Therapeutic Potential

Plants create phytochemicals for metabolic and defence reasons; they are bioactive substances that exist naturally. The therapeutic activities of plants are attributed to these molecules, which are mostly classified as secondary metabolites. Alkaloids, flavonoids, tannins, glycosides, terpenoids, saponins, phenolic compounds, steroids, and a host of other phytochemicals are found in medicinal plants. The many phytochemical classes contribute to illness prevention and treatment through their unique biological and pharmacological characteristics.

Phytochemical screening is important for determination of the active constituents for therapeutic effects. Flavonoids and phenolic compounds have proven to be highly antioxidant and beneficial against oxidative stress and free radical damage. Alkaloids have antimicrobial, analgesic and anticancer properties, while tannins show wound healing and anti-inflammatory properties. The immune stimulatory, antiviral and antidiabetic actions are linked to saponins and terpenoids. Phytochemicals have gained importance as valuable resources for generating modern drug products and herbal formulations because of their diverse medicinal uses.

The present study emphasizes botanical and phytochemical studies of selected medicinal plants of therapeutic importance for assessing their therapeutic importance and its applications in both traditional and modern medicinal system (Rana et al., 2018). The current study is aimed at scientifically confirming the therapeutic value of these plants and also encouraging their sustainable use in medical sciences and pharmaceuticals research.

1.3 Research Objectives

The purpose of the present study was to address the following research questions:

- To recognize and verify some medicinal plants used in therapy with their botanical and morphological features.
- To conduct qualitative phytochemical screening of extracts of medicinal plants to identify the major bioactive constituents.
- To assess the medicinal value and therapeutic value of the phytochemical constituents identified.

2. REVIEW OF LITERATURE

The therapeutic significance of medicinal plants and their rich phytochemical content, combined with their traditional applications in healthcare, has garnered significant scientific interest. In the world, researchers have studied medicinal plants in various aspects such as botanical, pharmacognostic, phytochemical, and ethnobotanical to confirm their medicinal value and to extract the phytochemical compounds responsible for their pharmacological activities. The scientific understanding and application of medicinal plants in contemporary healthcare and pharmaceutical research have been greatly enhanced by previous studies.

Ray and Rahaman (2018) have done a Pharmacognostic standardization and phytochemical study of Cajanus scarabaeoides (L.). Thouars. The researchers investigated the morphological, anatomical and microscopic features of the plant to arrive a botanical identity and authentication. In addition, they screened for potentially beneficial secondary metabolites using phytochemical methods, looking for things like alkaloids, flavonoids, tannins, and phenolic chemicals (Ray & Rahaman, 2018). When it comes to herbal medicine formulations, they discovered that pharmacognostic evaluation is crucial for guaranteeing the quality, purity, and standardisation of medicinal plant materials.

Saab et al. (2022) investigated the phytochemical profile of essential oils derived from Lebanon's medicinal plants and their possible anti-SARS-CoV-2/COVID-19 therapeutic activities. Several bioactive molecules with anti-inflammatory, antioxidant, and antiviral characteristics were identified by the scientists (Saab et al., 2022). Essential oils extracted from medicinal plants have shown promise as natural medicines due to their documented biological activity. Their research demonstrated the importance of phytochemicals in the search for plant-based remedies for newly-emerging illnesses.

In Darjeeling district of West Bengal, India, Subba, Hazra and Rahaman (2024) conducted a quantitative ethnobotanical research on the medicinal plants used in the area. The researchers noted the traditional uses for the medicinal plants of the area and the phytochemical constituents and toxicity profile of the Betula alnoides bark (Subba et al., 2024). Various

therapeutic phytochemicals were identified during the study and the therapeutic value of the selected species was established. They also found that ethnobotanical documentation was important for the conservation of traditional knowledge and the scientific validation of traditional medicinal uses.

In the Sarangarh tribal region of Chhattisgarh, India, Patel et al. (2025) investigated the use of medicinal plants and traditional methods of wound healing. The study documented cases of inflammatory illnesses, wounds, and skin infections treated using medicinal plants (Patel, 2025a). Traditional societies possessed excellent expertise in the creation and use of ethnomedicines, according to the researchers. Their study emphasised the significance of both scientific research validating the therapeutic efficacy of herbal medicines and the preservation of traditional medicinal knowledge.

In saline stress conditions, Patel (2025) investigated how microbial consortiums impacted seed biopriming. The study's findings revealed the role of beneficial microbial interactions in plant growth, seed germination, and stress resilience; nevertheless, the focus was on agricultural and environmental applications (Patel et al., 2025). Maintaining the availability and quality of medicinal plant resources is crucial, and our study indirectly aided with sustainable cultivation and productivity of medicinal plants under severe environmental conditions.

Besides these studies, researchers have reported the presence of various phytochemical constituents with antioxidant, antimicrobial, anti-inflammatory, antidiabetic, anticancer and hepatoprotective activities in medicinal plants. The scientific studies of medicinal plants have also emphasized the need for botanical authentication, phytochemical screening, toxicity assessment and pharmacologic studies for the safety and efficacy of herbal drugs.

From a general perspective, reviewed literature revealed that medicinal plants have great therapeutic potential and phytochemical diversity. The systematic botanical exploration, phytochemical identification, ethnobotanical recording and scientific validation of medicinal plants for their effective utilization in healthcare systems and pharmaceutical development were strongly emphasized in previous research studies.

3. RESEARCH METHODOLOGY

The current research was aimed at the botanical traits and phytochemical profile of some therapeutically relevant medicinal plants. The plants were collected with the aid of standard botanical, pharmacognostic and phytochemical methods, and the bioactive compounds qualitatively identified. The methodology was developed to ensure the accurate identification of the plant species as well as the reliable detection of the important phytochemical constituents associated with therapeutic activities.

3.1 Research Design

The study was designed as experimental and descriptive research using a laboratory investigation and botanical observation. This study mainly emphasizes on the identification, authentication and phytochemical analysis of the medicinal plant species widely used in traditional healthcare systems. For morphological and taxonomical study of plants, botanical analysis was done and for identification of presence of biologically active compounds in plant extracts, phytochemical screening was done.

3.2 Selection and Collection of Medicinal Plants

The selection of the therapeutic important medicinal plants was based on their traditional medicinal uses, therapeutic value and availability in the study area. Leaves, stems, rhizomes, flowers, bark and healthy plants of the same species as the plants used for the preparation of herbal medicine were collected from herbal gardens, agricultural areas and nature reserves. Special care was taken during sampling to prevent contamination and damage to plant material.

Table 1: Selected Medicinal Plants and Plant Parts Used

Sl. No.	Scientific Name	Common Name	Plant Part Used	Traditional Medicinal Use
1	Azadirachta indica	Neem	Leaves and Bark	Antimicrobial and skin disorders
2	Ocimum sanctum	Tulsi	Leaves	Respiratory and immune disorders
3	Aloe vera	Aloe vera	Leaf Gel	Wound healing and skin care
4	Curcuma longa	Turmeric	Rhizome	Anti-inflammatory and antioxidant
5	Withania somnifera	Ashwagandha	Roots	Stress relief and immunity enhancement

The collected plant samples were properly labeled, packed, and transported to the laboratory for further botanical and phytochemical analysis.

3.3 Botanical Identification and Authentication

Plant specimens collected were identified and authenticated according to the standard botanical manuals, floras, herbarium data and taxonomic keys. The morphology of leaves, stems, roots, flowers, seeds and habitat were carefully studied and noted. The scientific names, family classification and local names of selected medicinal plants were recorded for its proper scientific identification and for future reference.

3.4 Preparation of Plant Materials

To ensure that all of the plant materials were free of dirt, dust, and other contaminants, they were washed extensively with distilled water. In order to preserve the phytochemical components and reduce the degradation of the active compounds, the samples were shade dried at room temperature for a few days. The plant components were mechanically ground to a fine powder after they had dried. The powdered materials were dried and stored in sealed containers to avoid moisture before phytochemical analysis and further extraction.

3.5 Extraction of Plant Samples

Maceration extraction method was used to prepare the plant extracts in aqueous and ethanolic solvents. Powdered plant material was soaked in appropriate solvents at suitable concentrations for a particular period with occasional stirring to extract the phytochemical constituents. The extracted mixtures were filtered with filter paper and the filtrates were concentrated and kept in clean containers for phytochemical screening.

Solvent extraction from medicinal plants using aqueous and ethanolic solvents had helped to extract a wide range of polar and non-polar phytochemicals.

3.6 Phytochemical Screening

Important phytochemicals such as alkaloids, flavonoids, tannins, saponins, terpenoids, glycosides, phenolic compounds, and steroids were qualitatively screened for during the phytochemical screening process. Standard biochemical procedures and reagent-based tests were used for phytochemical identification.

The essential tests for Phytochemical Analysis are as follows:The following tests are essential for Phytochemical Analysis:

- Alkaloid Test
- Flavonoid Test
- Tannin Test
- Saponin Test
- Terpenoid Test
- Glycoside Test
- Phenolic Compound Test
- Steroid Test

Occurrence of characteristic colour changes or precipitates during the tests showed the presence of specific phytochemical constituents present in the extracts of the plants.

3.7 Data Analysis

The results from the botanical and phytochemical studies were systemically recorded and analysed with descriptive approach. The phytochemical constituents present in the various plants extracts were tabulated and interpreted using the standard procedure for phytochemical evaluation. Comparative analysis was also done for phytochemical diversity of selected medicinal plants.

3.8 Ethical and Scientific Considerations

This study was aimed at giving scientific documentation of medicinal plants and correct botanical identification. The selected plant species are associated with traditional medicinal knowledge which was used only for academic and research purposes. The reliability, authenticity, and reproducibility of the research results were ensured by taking the necessary precautions during the collection of plants, handling of samples, extraction processes, and laboratory analyses. Sustainable collection practices were also taken into account to prevent unnecessary damages to natural medicinal plant resources.

4. RESULTS AND DISCUSSION

The present study was aimed at the study of botanical features and phytochemical analysis of some medicinal plants used in treatment of different ailments. The results from botanical authentication and phytochemical screening revealed the medicinal value of selected botanicals. The following subsections discuss the results.

4.1 Botanical Identification and Authentication

The medicinal plants were well identified, and authenticated by their morphological and taxonomical features. The morphological characteristics of leaves, stem, root system, floral

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arrangement and habitat conditions were carefully examined. The authenticity and medicinal significance of the selected plant species was confirmed through botanical investigations.

Table 2: Botanical Details of Selected Medicinal Plants

Sl. No.	Scientific Name	Common Name	Family	Plant Part Used
1	Azadirachta indica	Neem	Meliaceae	Leaves, Bark
2	Ocimum sanctum	Tulsi	Lamiaceae	Leaves
3	Aloe vera	Aloe	Asphodelaceae	Leaf Gel
4	Curcuma longa	Turmeric	Zingiberaceae	Rhizome
5	Withania somnifera	Ashwagandha	Solanaceae	Roots

The botanical examination revealed that all selected plants belonged to different families and possessed unique morphological characteristics. The identification process ensured the purity and authenticity of plant materials used for phytochemical analysis.

4.2 Morphological Characteristics of Medicinal Plants

Morphological observations were conducted to study the external structural features of the medicinal plants. The analysis included observations of leaf arrangement, stem texture, root type, and growth habit.

Table 3: Morphological Characteristics of Selected Medicinal Plants

Plant Name	Leaf Characteristics	Stem Characteristics	Root Type	Growth Habit
Neem	Compound and serrated	Woody stem	Tap root	Tree
Tulsi	Simple and aromatic	Soft herbaceous stem	Fibrous root	Herb
Aloe vera	Thick succulent leaves	Short stem	Fibrous root	Succulent herb
Turmeric	Broad green leaves	Underground rhizome	Adventitious root	Herb
Ashwagandha	Ovate leaves	Branched stem	Tap root	Shrub

The morphological differences among the medicinal plants played a significant role in their identification and classification. Such botanical parameters are essential for standardization and quality control of herbal medicines.

4.3 Phytochemical Screening of Plant Extracts

Several significant bioactive chemicals were found in the selected medicinal plant extracts through qualitative phytochemical analysis. The phytochemical diversity was significantly higher in the ethanolic extract than in the water-based one.

Table 4: Qualitative Phytochemical Screening of Medicinal Plants

Phytochemical Constituent	Neem	Tulsi	Aloe vera	Turmeric	Ashwagandha
Alkaloids	+	+	–	+	+
Flavonoids	+	+	+	+	+
Tannins	+	+	–	+	+

Saponins	+	–	+	+	+
Terpenoids	+	+	+	+	+
Glycosides	+	+	+	–	+
Phenolic Compounds	+	+	+	+	+
Steroids	–	+	+	–	+

Note: (+) Present, (–) Absent.

The phytochemical screening revealed that the majority of plant extracts contained phenolic chemicals, flavonoids, and terpenoids. It is well-known that these phytochemicals have antioxidant and anti-inflammatory effects. Several plants also included tannins and alkaloids, which could have medicinal or antibacterial properties.

4.4 Therapeutic Importance of Identified Phytochemicals

The identified phytochemical constituents were correlated to different pharmacological/medicinal properties. The traditional medicinal uses of selected plants were corroborated by multiple bioactive compounds.

Table 45: Therapeutic Activities of Major Phytochemicals

Phytochemical	**Major Therapeutic Activity**
Alkaloids	Antimicrobial and analgesic activity
Flavonoids	Antioxidant and anti-inflammatory activity
Tannins	Antimicrobial and wound healing activity
Saponins	Immune-boosting and anticancer activity
Terpenoids	Antiviral and anti-inflammatory activity
Glycosides	Cardioprotective and antidiabetic activity
Phenolic Compounds	Antioxidant and hepatoprotective activity
Steroids	Hormonal and anti-inflammatory activity

The existence of these phytochemicals suggested that the selected plants could be used as medicinal plants for treating various diseases and disorders. The flavonoids and phenolic compounds had significant contributions towards antioxidant activity, whereas terpenoids and alkaloids gave rise to antimicrobial and therapeutic properties. The results supplement past research studies which pointed to the pharmacologic significance of medicinal plants.

4.5 Discussion

In the present research the botanical and phytochemical diversity of the medicinal plants with its important therapeutic applications was confirmed (Patel, 2025b). Accurate identification and classification of medicinal plants species was carried out with the help of botanical authentication which is important for ensuring quality, purity, safety and efficacy of herbal medicines. The process also helps in the identification of plants to avoid the risk of adulteration and misuse of plant materials used in traditional and pharmaceutical medicine. The observations made in this study showed that there are significant differences in the morphological and taxonomical characteristics of the selected medicinal plants, which justified their scientific documentation (Patel & Bharti, 2025).

Phytochemical screening of the various plant extracts revealed a few important secondary metabolites such as alkaloids, flavonoids, tannins, terpenoids, saponins, glycosides and phenolic compounds. The phytochemicals are identified to exert the medicinal effect of plants and have been correlated to various biological and pharmacological activities. Flavonoids and phenolic compounds were present in high amounts, suggesting a high antioxidant activity, providing protection against free radical damage and oxidative stress (Patel & Bharti, 2025). Likewise, the antimicrobial and anti-inflammatory activity was seen in alkaloids and tannins, and possible immune-modulatory and therapeutic effects were observed from terpenoids and saponins.

Neem, Tulsi, Turmeric, Aloe vera, and Ashwagandha are medicinal plants that have a wealth of beneficial bioactive compounds, according to the research. This justifies their extensive use in traditional medicine. While the alkaloids and tannins in neem made it a powerful antibacterial and therapeutic herb, the flavonoids and phenolics in tulsi gave it antioxidant and anti-inflammatory properties. The phenolics and terpenoids in turmeric gave it strong therapeutic effects, and the aloe vera in aloe vera helped heal wounds and moisturise skin. There were a number of phytochemicals in ashwagandha that were associated with adaptogenic effects, immune system enhancement, and stress reduction.

The study's findings corroborated those of earlier investigations on the therapeutic potential of phytochemical components found in herbal remedies. It was determined that medicinal plants possess pharmaceutical potential due to their present phytochemical diversity, which could lead to the creation of herbal drugs, nutraceuticals, and natural therapeutic products. The study also found that in order to validate the therapeutic value of herbs, scientific investigation is needed, together with traditional medicinal knowledge.

Overarchingly, the research shows that medicinal plants are significant because they are a natural supply of medications that have many different therapeutic applications. The results demonstrated the need for more clinical, pharmacological, toxicological, and phytochemical investigations to isolate the plant's active ingredients and develop standardised preparations that are safe, effective, and up to date for usage in contemporary healthcare systems.

5. CONCLUSION AND RECOMMENDATIONS

The objective of this research was to examine the phytochemical and botanical properties of a selection of plants with traditional medical uses. Botanical examination confirmed the plant species and identified it; phytochemical screening revealed the presence of numerous important bioactive chemicals, such as phenolic compounds, alkaloids, flavonoids, tannins, and terpenoids. Significant medicinal roles, including antioxidant, antibacterial, anti-inflammatory, and antidiabetic effects, have been associated with these phytochemicals. The findings validated the usefulness of these plants in herbal medicine and pharmaceutical research; they include Neem, Tulsi, Aloe vera, Turmeric, and Ashwagandha. Botanical authentication and phytochemical evaluation are crucial for determining the purity and effectiveness of therapeutic plant products, according to the study.

- Phytochemical and pharmacological investigations are needed further to determine the active medicinal compounds.

- Conservation and sustainable cultivation of medicinal plants be encouraged.
- Good quality control and standardisation techniques should be used for the preparation of herbal medicines.

REFERENCES

1. Achimugu, L. (2022). Phytochemical analysis and Ethno-botanical Uses of Gongronema latifolium Benth. International Journal of Medicinal Plants Research, 10(3), 38-46.
2. Anil, N., & Talluri, V. R. (2021). Phytochemical analysis of selected indian medicinal plants by hr-lcms spectra method. Rasayan Journal of Chemistry, 14(4), 2318-2326.
3. Awuchi, C. G. (2019). Medicinal plants: the medical, food, and nutritional biochemistry and uses. International Journal of Advanced Academic Research, 5(11), 220-241.
4. Bhat, S. G. (2021). Medicinal plants and its pharmacological values. In Natural medicinal plants. IntechOpen.
5. Gupta, R. K., & Deogade, M. (2018). A critical review on ethnobotanical, phytochemical and pharmacological investigations of Martynia annua Linn. International journal of ayurvedic medicine, 9(3), 136-143.
6. Kaushik, B., Sharma, J., Kumar, P., & Shourie, A. (2021). Phytochemical properties and pharmacological role of plants: secondary metabolites. Biosciences Biotechnology Research Asia, 18(1), 23.
7. Rana, M., Sharma, P., Mahima, R. C., & Sharma, P. (2018). Proximate and phytochemical screening of the seed and pulp of Tamarind indica. Journal of Medicinal Plants, 6(2), 111-115.
8. Ray, A. S., & Rahaman, C. H. (2018). Pharmacognostic standardization and phytochemical investigation of Cajanus scarabaeoides (L.) Thouars. Research Journal of Pharmacognosy and Phytochemistry, 10(1), 120-131.
9. Saab, A. M., Tacchini, M., Sacchetti, G., Contini, C., Schulz, H., Lampronti, I., ... & Racagni, G. (2022). Phytochemical analysis and potential natural compounds against SARS-CoV-2/COVID-19 in essential oils derived from medicinal plants originating from Lebanon. An information note. Plant Biosystems-An International Journal Dealing with all Aspects of Plant Biology, 156(4), 855-864.
10. Subba, Y., Hazra, S., & Rahaman, C. H. (2024). Quantitative ethnobotany of medicinal plants from Darjeeling District of West Bengal, India, along with phytochemistry and toxicity study of Betula alnoides Buch.-Ham. ex D. Don bark. Plants, 13(24), 3505.
11. Patel, R. K., Bharti, A. K., Patel, M., & Jangde, L. (2025). Explore traditional wound healing practices and medicinal plant use in Sarangarh tribal communities, Chhattisgarh. International Journal for Multidisciplinary Research, 7(3). https://doi.org/10.36948/ijfmr.2025.v07i03.44451
12. Patel, R. K. (2025). Biopriming of seeds with microbial consortia to enhance germination and early growth performance under saline stress conditions. International Journal of Research and Technology, 5(2), Part A.

13. Patel, R. K. (2025). Village pharmacopeia: Traditional medicinal plant use among rural communities in Raigarh district, Chhattisgarh. Journal of Scientific Research in Allied Sciences, 11(5), 633–648. https://www.jusres.com
14. Dr. Rajesh Kumar Patel, Prof. Dr. Ashok Kumar Bharti. (2025). Phytochemical Diversity of Medicinal Plants and Their Pharmacological Significance. International Journal of Advanced Research and Multidisciplinary Trends (IJARMT), 2(4), 01–12. Retrieved from https://ijarmt.com/index.php/j/article/view/514
15. Patel, R. K., & Bharti, A. K. (2025). Phytochemical profiling and screening of antimicrobial activity of weed in Raigarh, Chhattisgarh. Shodhshauryam International Scientific Refereed Research Journal, 8(4).
16. Patel, R. K. (2025). Village pharmacopeia: Traditional medicinal plant use among rural communities in Raigarh district, Chhattisgarh. Journal of Scientific Research in Allied Sciences, 5, 633–648. ISSN: 2455-5800. Journal of Scientific Research in Allied Sciences
17. Patel, R. K., & Bharti, A. K. (2025). Phytochemical profiling and screening of anti-microbial activity of weed in Raigarh, Chhattisgarh. Shodhshauryam, International Scientific Refereed Research Journal, 8(4), 70–81. ISSN: 2581-6306. Shodhshauryam International Scientific Refereed Research Journal
18. Patel, R. K. (2025). Biopriming of seeds with microbial consortia to enhance germination and early growth performance under saline stress conditions. International Journal of Plant Pathology and Microbiology, 5(2), 23–29. ISSN: 2789-3065 (Print), 2789-3073 (Online). International Journal of Plant Pathology and Microbiology DOI
19. Patel, R. K. (2026). Impact of small-scale mining and agricultural expansion on plant community composition in Raigarh. International Journal of Research and Technology (IJRT), 14(1), 334–350. ISSN: 2321-7510 (Print), 2321-7529 (Online). International Journal of Research and Technology
20. Patel, R. K., & Bharti, A. K. (2025). Phytochemical diversity of medicinal plants and their pharmacological significance. International Journal of Advanced Research and Multidisciplinary Trends, 2(4), 1–12. ISSN: 3048-9458. International Journal of Advanced Research and Multidisciplinary Trends
21. Patel, R. K., Bharti, A. K., Patel, M., & Jangde, L. (2025). Explore traditional wound healing practices and medicinal plant use in Sarangarh tribal communities, Chhattisgarh. International Journal for Multidisciplinary Research, 7(3), 1–13. ISSN: 2582-2160. International Journal for Multidisciplinary Research DOI
22. Dr. Rajesh kumar patel. (2026). Analytical Study Of Secondary Metabolites In Medicinal Plant Species. International Journal of Advanced Research and Multidisciplinary Trends (IJARMT), 3(2), 720–728. Retrieved from https://ijarmt.com/index.php/j/article/view/983