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Chemical Study of Indigenous Plants for Respiratory Health of Nimar Region of Madhya Pradesh

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Abstract: In recent years, there has been a growing focus on indigenous plants that have been traditionally used by local communities for the treatment of various ailments. In the Nimad region of Madhya Pradesh, India, respiratory diseases are a significant health concern, particularly among rural populations (Prakash 2024). The use of medicinal plants by indigenous communities in the Nimad region of Madhya Pradesh (M.P.), India (Figure 1.1), represents a longstanding tradition deeply rooted in cultural heritage and practical healthcare solutions.

This research study documents the medicinal uses and local names of eight native plants that are commonly used by folk healers. The plants were collected, dried and ground into powder for phytochemical and antimicrobial analysis. The study focused on preliminary phytochemical screening and spectroscopic analysis of these plants that are used in both Monoherbal and polyherbal formulations to treat respiratory disorders.

Keywords: Indigenous Plants, Respiratory Health, Nimar region.

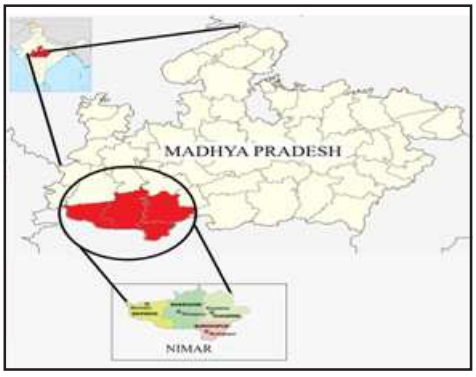
Introduction - In rural and tribal regions, where access to modern healthcare facilities is scarce, traditional medicine plays a vital role in meeting the healthcare needs of communities. These areas, rich in natural biodiversity, rely heavily on local healers and ethnobotanical knowledge passed down through generations. Medicinal plants like **Neem**, **Tulsi**, and **Amla** are commonly used to treat ailments such as fevers, skin conditions, and respiratory issues. Tribal healers prepare remedies using roots, leaves, and fruits, often combined with spiritual practices.

Research emphasizes the importance of medicinal plants such as aloe, ginger, turmeric and Tulsi in addressing numerous common respiratory conditions. These plants are rich in bioactive compounds, including tannins, alkaloids, sugars, terpenoids, steroids, and flavonoids, which have various therapeutic applications (Shrinet 2021; Chanda and Ramachandra 2019). Certain medicinal plants, especially *Echinacea purpurea* and *Zingiberofficinale*, show promise as adjunctive treatments for respiratory disorders like chronic obstructive pulmonary disease (COPD), bronchitis, asthma, the common cold, cough, and whooping cough (Rayburn 2007).

Leaves from plants such as Acacia torta, Ocimum sanctum, Convolvulus pluricaulis, and Acalyphaindica are frequently utilized for treating pneumonia, bronchitis, asthma, colds, and coughs (Firdaus *et al* 2024). The study seeks to highlight particular medicinal plants with therapeutic potential, offering valuable insights for researchers in herbal medicine (Anand *et al* 2019). These plants may serve as innovative therapeutic agents in combating respiratory diseases (Izah*et al* 2024).

The study of physico-chemical properties of Indigenous medicinal plants for respiratory diseases is essential in understanding the therapeutic potential of these traditional remedies (Saeidy*et al* 2021). Indian medicinal plants have long been used in Ayurveda and traditional medicine to treat various ailments, including respiratory diseases. By analyzing the physico-chemical properties of these plants, researchers can identify key compounds responsible for their medicinal properties, such as antioxidants, anti-inflammatory agents, and antimicrobial substances (Sinha 2016; Shahrajabian and Sun 2023).

Fig 1.1: Madhya Pradesh, Nimar Region



Source:https://en.wikipedia.org/wiki/List_of_districts_of_Madhya_Pradesh

Objective of the study: To conduct chemical study of

native plants for respiratory health of Nimar region of Madhya Pradesh.

Material and Methods : This section details the procedures and methodologies employed in the physico-chemical study of certain indigenous medicinal plant parts used for respiratory diseases by the tribal community of the Nimad region of Madhya Pradesh (M.P.). The objective of this study is to evaluate the chemical composition, phytochemical properties, and potential therapeutic benefits of these plants. This investigation is crucial for validating traditional medicinal practices and possibly discovering new therapeutic agents.

The study documented medicinal uses and vernacular names of eight indigenous plants commonly used by folk practitioners. The plants were collected, dried, and ground into powder for phytochemical and antimicrobial analysis. The study focused on the preliminary phytochemical screening and spectroscopic analysis of these plants, which are used in both monoherbal and polyherbal formulations to treat respiratory disorders.

This study undertook the preliminary phytochemical screening and spectroscopic analysis of these 8 plants.

Name of Indigenous plants for respiratory health

S.	Symbol	Plant Name	Family Name	Plant Parts
1	P_1	*Albizialebbeck*	Fabaceae	Seed
2	P_2	*Curcuma amada*	Zingiberaceae	Rhizome
3	P_3	*Madhucaindica*	Sapotaceae	Flower
4	P_4	*Solanum xanthocarpum*	Solanaceae	Berries
5	P_5	*Lantana camara*	Verbenaceae	Leaves
6	P_6	*Acacia nilotica*	Fabaceae	Bark
7	P_7	*Ocimum sanctum*	Lamiaceae	Leaves
8	P_8	*Zingiberofficinale*	Zingiberaceae	Rhizome

Results and Discussion: The discussion interprets these results in the context of existing literature and their implications for traditional medicine and potential therapeutic applications. Herbal medicine, or ethnomedicine, is a traditional healing practice used by indigenous people to treat human and animal illnesses. It integrates cultural perspectives on health and illness and is increasingly important due to antibiotic resistance. Phytochemicals from plants are used in ethnopharmacology to treat plant-based illnesses, but their chemical compositions are still unknown.

Analysis of the plant used in respiratory disorders revealed the presence of phytoconstituents including n-Hexadecanoic acid, 9,12-Octadecadienoic acid, Phthalic acid, bis(2-pentyl) ester, Hentriacontane, 17-Pentatriacontene, Vitamin E, Campesterol, Tetradecane, (Z,Z)-9-Hexadecenoic acid, 9-octadecenyl ester, Tetrapentacontane, 1,54-dibromo, α-Curcumene,β-Curcumene, Camphor, Curzerenone, 1,8-Cineole, Curcumin, Demethoxy Curcumin, Bis-Demethoxy Curcumin, Caffeic Acid, Ferulic Acid, Ethane, 1,2-bis[(4-amino-3-furazanyl)oxy]-, 1,3-Cyclopentenedione, 5-Isopropyl-2-methylbicyclo[3.1.0]hex-2-ene,1,2-Cyclohexanedione, Ethanone, 1-(6-methyl-7-oxabicyclo [4.1.0]hept-1-yl)-, 7-Octen-2-ol, 2,6-dimethyl-, Propanoic acid, 2-oxo-, 1-(Methylencyclopropyl)-ethanol, 2,2,6-Trimethyl-3,5-heptanedione,1-Pyrrolid-2-one,N-carboxyhydrazide, Hexanoic acid, ethyl ester, Dodecanoic acid, (1R,3R,4R,5R)-(-)-Quinic acid, Tetradecanoic acid, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, n-Hexadecanoic acid, Hexadecanoic acid, ethyl ester, Phytol, 9,12-Octadecadienoic acid (Z,Z)-, 9,12,15-Octadecatrienoic acid, (Z,Z,Z)-, 2-Propanone, 1-hydroxy-, Propargyl alcohol, Furfuryl alcohol, 2,3-Dihydro-2,5-dihydroxy-6-methyl-4H-pyran-4-one, Cyclohexasiloxane, dodecamethyl-, 4-Vinylguaiacol, Bicyclo[5.2.0]nonane, 2-methylene-4,8,8-trimethyl, Germacrene-D, 4-Epi-cubedol, Caryophyllene oxide, Oct-2-ynoic acid, Bergamotol, Z-Alpha-Trans, Neophytadiene, Octadecanoic acid, 1,E-6,Z-11-Hexadecatriene, 9,12-Octadecadienoyl chloride, (Z,Z)-, 9-Octadecenamide, 12-Hydroxy-9-Octadecenoic acid (Ricinolic acid), Stigmast-5-En-3-ol, Oleate, Stigmast-5-En-3-ol, (3.Beta.)-, Bicyclo[2.2.1]heptan-2-ol, 1,7,7-trimethyl, Cyclohexane, 1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-, [1S-(1.alpha.,2.beta.,4.beta.), 1,4,8-Cycloundecatriene, 2,6,6,9-tetramethyl-, (E,E,E), decahydro-4a-methyl-1-methylene-7-(1-methylethenyl)-, [4aR-(4a.alpha.,7.alph)], 1,1,4,7-Tetramethyldecahydro-1H-cyclopropa[e]azulene-4,7-diol, Neophytadiene, Ethyl 9-hexadecenoate, Dotriacontane, 1-iodo-, Tetrapentacontane, Hexatria contane, α-Pinene, Camphene, β-Pinene, 1-Phellandrene, 1,8-Cineol, Z-Citral, E-Citral, Ar-Curcumene, Zingiberene, α-Farnesene, attributed activity like antibronchitic, antibacterial, bronchodilator, antioxidant, COX-2 inhibitor, antispasmodic, bronchotonic, antitussive, antipharyngitic candidicidal, antiviral, anticancer (lung), anticystic antibacterial, antiseptic, antiedemic, antimicrobial, analgesic and anti-inflammatory properties. In the present investigation the antimicrobial activity of benzene, acetone, chloroform, ethyl acetate and distilled water extracts of 8 (eight) plants against 6 (six) clinically important disease-causing microorganisms was analyzed using disk diffusion methods.

Various plant species used in treating respiratory disorders include P1, P2, P3, P4, P5, P6, P7, P8. Extracts from these plants demonstrated sensitivity to the pathogen *Streptococcus pneumoniae* and showed inhibitory effects against *Corynebacterium diphtheriae*. Additionally, these extracts exhibited antimicrobial activity against *Mycobacterium tuberculosis* and sensitivity to *Pseudomonas aeruginosa*. *Bordetella pertussis* also displayed antimicrobial sensitivity to extracts from Pistacia, a plant traditionally used for respiratory issues. It is concluded that *Streptococcus pneumoniae*, *Corynebacterium diphtheriae*, *Candida albicans*, and *Streptococcus pharyngitis* were particularly sensitive to the extracts from these respiratory disorder treatments.

Furthermore, the extracts reacted to all tested Gram-negative bacteria.

Conclusion: The comprehensive physico-chemical study of indigenous medicinal plant parts used for respiratory diseases by the tribal community of the Nimad region in Madhya Pradesh (M.P.) has yielded significant insights into the traditional medicinal practices and the potential therapeutic properties of these plants. This research has underscored the importance of integrating traditional knowledge with modern scientific techniques to validate and potentially expand the applications of these natural remedies in contemporary medicine.

The tribal communities of Nimad, including the Bhil, Bhilala, and Barela tribes, have utilized local flora for generations to treat respiratory ailments such as asthma, bronchitis, and tuberculosis. The ethnobotanical survey conducted as part of this research provided a wealth of information on the methods of preparation, dosage, and administration of these plants, thus preserving this invaluable traditional knowledge.

Infectious agents, which are mostly transmitted by respiratory droplets expelled while coughing, sneezing, talking, singing, or physical exertion, play a critical role in the research of respiratory disorders. The danger of transmission is greatly increased by crowded environments and close closeness. The common pathogens that cause respiratory infections include adenoviruses, rhinoviruses, and human coronaviruses. Bacteria like Mycobacterium TB and Streptococcus pneumoniae also play a significant role. Vulnerable groups, such as the elderly, young children, and those with long-term medical issues, are disproportionately affected by these illnesses.

A wide variety of secondary metabolites with distinct solubility profiles were identified by phytochemical investigations of these plants. Potential therapeutic uses and the choice of suitable extraction techniques are informed by this variety in solubility, which ranges from wide to selective. Flavonoids, tannins, alkaloids, and steroids are among the important substances that have been found; each has unique solubility properties that affect their potential as therapeutic agents.

References:-

1. Abate, L., Bachheti, R. K., Tadesse, M. G., &Bachheti, A. (2022). Ethnobotanical uses, chemical constituents, and application of Plantagolanceolata L. *Journal of Chemistry*, *2022*(1), 1532031.
2. Ahmad, I., Zahin, M., Aqil, F., Hasan, S., Khan, M. S. A., &Owais, M. (2008). Bioactive compounds from Punicagranatum, Curcuma longa and Zingiberofficinale and their therapeutic potential. *Drugs of the Future*, *33*(4), 329.
3. Ahmed, D., Kumar, V., Verma, A., Gupta, P.S., Kumar, H., Dhingra, V., Mishra, V. and Sharma, M., 2014. Antidiabetic, renal/hepatic/pancreas/cardiac protective and antioxidant potential of methanol/dichloromethane extract of Albizzia LebbeckBenth. stem bark (ALEx) on streptozotocin induced diabetic rats. *BMC complementary and alternative medicine*, *14*, pp.1-17.
4. Ahmed, M. U. (2019). Isolation of marker compounds from the leaves of adhatodavasica and their biological activities.
5. Akbar, S., & Akbar, S. (2020). Justiciaadhatoda L.(Acanthaceae) (Syns.: AdhatodavasicaNees.; A. pubescensMoench.; A. zeylanicaMedik.; Diantheralati -foliaSalisb). *Handbook of 200 Medicinal Plants: A Comprehensive Review of Their Traditional Medical Uses and Scientific Justifications*, 1059-1066.
6. Bhadra, P., &Sethi, L. (2020). A review paper on the Tulsi plant (Ocimum sanctum). *Indian Journal of Natural Sciences*, *10*(60), 20854-20860.
7. Bhargava, S. (1986). Estrogenic and postcoitalanti conceptive activity in rats of butin isolated from Buetamonosperma Seed, J Ethnopharmacol, 1: 95-101.
8. Bhat, S. G. (2021). Medicinal plants and its pharmacological values. *Natural medicinal plants*, *12*, 217-228.
9. Bhowmik, D., Tripathi, K. K., Chandira, M. R., & Kumar, K. P. (2010). Zingiberofficinale the herbal and traditional medicine and its therapeutically importance. *Research Journal of Pharmacognosy and Phytochemistry*, *2*(2), 102-110.
10. Jain, J. B., Kumane, S. C., & Bhattacharya, S. (2006). Medicinal flora of Madhya Pradesh and Chattisgarh–a review.
11. Jamshidi-Kia, F., Lorigooini, Z., &Amini-Khoei, H. (2017). Medicinal plants: Past history and future perspective. *Journal of herbmed pharmacology*, *7*(1), 1-7.
12. Sinha, R. (2016). *A Pharmaceutico-Analytical Study of TriphalaMasi and its Anti-Microbial Activity* (Doctoral dissertation, Rajiv Gandhi University of Health Sciences (India)).
13. Sobia, H. N., Khan, S., & Nadeem, F. (2018). Use ofmalabar nut (Justiciaadhatoda L.) from traditional medicine to current pharmacopeia–A review study. *Int J ChemBiochem Sci*, *13*, 46-51.
14. Zhukovets, T., &Özcan, M. M. (2020). A review: composition, use and bioactive properties of ginger (Zingiberofficinale L.) rhizoms. *J. Agroaliment. Proc. Technol*, *26*, 216.
15. Zia-Ul-Haq, M., Ahmad, S., Qayum, M., &Ercişli, S. (2013). Compositional studies and antioxidant potential of Albizialebbeck (L.) Benth. Pods and seeds. *Turkish journal of Biology*, *37*(1), 25-32.

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