**ETHNOBOTANICAL AND PHYTOPHARMACOLOGICAL REVIEW OF PISONIA ALBA SPAN**

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**ABSTRACT**

*Pisonia alba* is used for the long period in various chronic diseases in traditional medicine use. To desire of this review is to search literature for the pharmacological properties toxicity studies, pharmacology studies and phytochemical exploration of anti-inflammation, antidiabetic studies, antioxidant, etc., and the amassed data may be helpful for the researchers to attention on the significance areas of research yet to be revealed. Widespread information about the plant has been taken from various books, journals and ayurvedic classical texts, etc. Researcher and pharmacologist and Ayurveda treatment may be helpful security of the whole plant was settled in the criticism.

**Keywords:** *Pisonia alba*, Antioxidant, Ayurvedic, Novel drug, Ethno botanical.

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**INTRODUCTION**

Medicinal plants besides therapeutic agents are also a big source of information for a wide variety of chemical constituents which could be developed as drugs with precise selectivity [1]. Since primordial period various plants are being used for the progress of medicinal use in trebles now a day in present scenario new drugs develop and phyto medicine for the treatment of various diseases human begins [2]. Urban forests and trees are getting more importance of evolving countries for pharmacy studies [3]. They are the vital components in urban biodiversity and play a major role of abatement of global warming [4]. Medicinal plants are a natural gift for human beings disease free and healthy life [5]. The herbal products today are considered to be safer to human and environment in India has different parts of several medicinal plants or their extracts are used for the treatment of various diseases [6]. Herbal medicines have not gained much importance due to the deficient in of scientific facts for their mechanism of exploit [7]. According to the World Health Organization state that traditional medicine is used in plant parts such as a leaf, stem, bark, and flowers estimated to be used medicine by 80% of the population most of developing countries [8]. Phytochemicals are bioactive chemicals of plant origin. The plant cooking did not affect significantly calcium bioavailability had a very high content of total oxalates, tannins, and dietary fibers, which reduced calcium bioavailability [9]. They are regarded secondary metabolic activity because the plants that manufacture them may be have little need for the human population. The extraction and characterization of several active phyco compounds from these green factories have given birth to some high activity drug profile [10]. Both primary and secondary compounds form phytochemicals, where in the primary constituents include chlorophyll, proteins, and common sugars and the secondary compounds are total terpenoid, flavonoids, alkaloids, phenolic compounds, glycosides, gums, tannins, and essential oils among others [11]. *Pisonia alba* has various activities carried and done by best results like in vitro propagation [12]. *Nyctanthes arbor-tristis* is a small family of trees, to be used various human diseases using various formulated like shrubs and herbs distributed mainly in tropical and subtropical regions In around world [13]. *Nyctanthes* family totally 17 plants awail various tropical region and similar phytomedicine parallel to *Abronia latifolia* propagation and field crop production. Hawk moth pollination of *Mirabilis longiflora* [14]. *Boerhavia diffusa* the roots are reputed to be diuretic and laxative and are given for the treatment of anasarca, ascites, jaundice then hypoglycemic also recovered [15,16]. *Boerhavia erecta* histochemical and biochemical and antioxidant diabetes, inflammation, stress, hepatotoxicity, jaundice, and heart failure effort done by similar family [17]. The extraordinary antioxidant, hepatoprotective, antibiotic, antidiabetic, and anticarcinogenic properties at hand identical plant [18]. *B. erecta* is a potential source have been discussed phytochemicals screening results such as shown on antioxidants enhance particular plant [19]. In vitro antibacterial activity and hypoglycemic activity of *Bougainvillaea spectabilis* leaves extracts benefit [20,21]. Antidiabetic and hypolipidemic effects of the aqueous leaf extract to be used *Bougainvillea* species [22]. Antibacterial activity against of *B. spectabilis* [24] proteins from *Mirabilis jalapa* possess anticaner activity controlled via an apoptotic pathway [25]. Importance of white flowered *M. jalapa* was respect to be its analyzed phytochemical extraction and best results given for antimicrobial screening [26] and antibacterial activity of *M. jalapa* flower act as against gastrointestinal pathogens [27]. *Nyctanthes arbor-tristis* act as against targeting pathogenic like bacteria [28] hepatoprotective and antipyretic effect of bark of *Nyctanthes arbor-tristis* use trebles [29]. Similar plants have so many disease cures and recovery acting traditional and now a day.

Hence, in this review monitoring plant conservation and awareness modern lead. This review may be help made to investigate medicinal plants and health professionals, scientists and scholars operational in the field of pharmacology and therapeutics to develop various drugs synthesis and build new remedies various diseases (Table 1).

**P. ALBA PLANT HISTORY**

*Pisonia* is a genus of flowering plants in the 4 O’clock flower family, Nyctaginaceae. It was named for Dutch physician and naturalist Willem Piso (1611-1678). Certain species in this genus are known as catch 4 O'clock flower, *Nyctanthes arbor-tristis*. It is used for the long period in various chronic diseases in traditional medicine use. To desire of this review is to search literature for the pharmacological properties toxicity studies, pharmacology studies and phytochemical exploration of anti-inflammation, antidiabetic studies, antioxidant, etc., and the amassed data may be helpful for the researchers to attention on the significance areas of research yet to be revealed. Widespread information about the plant has been taken from various books, journals and ayurvedic classical texts, etc. Researcher and pharmacologist and Ayurveda treatment may be helpful security of the whole plant was settled in the criticism.
HABITAT AND ECOLOGY

Pisonia is found on many of the Seychelles Islands that have had habitat restoration and subsequently is a key part of the habitat associated with high biodiversity and a complex food web. It is therefore not as easy as replacing Pisonia with other native tree species; it was discovered by [30] that Pisonia is the most common nest tree for the Seychelles warbler an endemic land bird brought back from near extinction by careful habitat management and translocation, thus showing that careful consideration of the entire island ecosystem is essential.

P. alba is a large evergreen shrub. It is originally from the beach forests of Andaman Islands. Leaves: Long, bouncy, and fresh green in color. If planted in good sunlight, the leaves may acquire a light yellow color. Flowers: The tree rarely flowers in India. The flowers are small, green, and inconspicuous. Uses: The leaves are edible. Young leaves are used as a vegetable. Leaves make good cattle feed too and are mostly used to treat rheumatism or arthrosis.

PHYTOCHEMICAL ANALYSIS

The phytochemical of P. alba showed the presence of vitamin A, vitamin C, thiamine, riboflavin, nicotine acid (vitamin B3), alkaloids, proteins, and fats. Vitamin C is one of the four dietary antioxidants, the others being vitamin E, vitamin A precursor β-carotene, and selenium [31]. Various reported to ethanol extract revealed the presence of tannins, saponins, steroids and phenolic constituents, insulinomimetic pinitol, and kerolytic allantoin [32]. Unfussy appearance in the chromatogram of leaves of Pisonia grandis revealed that 9-octadecenoic acid, 1,2,3-propanetriyl ester, phytol, and n-hexadecanoic acid are the major phytoconstituents. Among the most prevailing phytoconstituents, n-hexadecanoic acid, 9-octadecenoic acid, and phytol are therapeutically significant molecules. Occurrence of these molecules in the extracts of P. alba validates the use of this plant in the treatment of various ailments by tribals and traditional healers.

Chemical composition

Secopionic acid, 6,8-dimethylgenistein, (+)-ent-Ficusol, pisoninol I, pisoninol II, isoquinoline, pisodienone, 2,6-dimethyl-1,4-benzoquinone, gold fussolin, pavonin, β-hydroxypropiosyringone, e-hydroxypropiosyringone, e-hydroxypropiosyringone, C-veratrylglycol, trans-methyl ferulate, vanillin, syringaldehyde, methyl syringate, 24-Methylene-3,4-seco-cycloart-4(28)-en-3-olic acid, N-trans-Feruloyl-4′-O-methyldopamine, N-trans-Feruloyl-trans-methyl ferulate, vanillin, syringaldehyde, methyl syringate, α-hydroxypropiosyringone, C-veratroylglycol, α-hydroxypropiovanillone, α-hydroxypropisosyringone, C-veratroylglycol, Secopisonic acid, 6,8-dimethylisogenistein, (+)-ent-Ficusol.

Medicinal properties

The upshot of the review will further assist in presenting its potential scientific use in modern medicine world antioxidant and antidiabetic solution for human and its developing drug design Table 2 shows in phytomedicine studies.

CONCLUSION

P. alba is used as an important ingredient in many ayurvedic formulations and phytomedicine compound just on basis of its traditional medicinal uses. It may be generated researchers good novel drug design and drug development using such a medicinal plant it's grow medicine ayurvedic revolution various cultivated, natural medicinal plant and ornamental, sea weed sea grass plants to be initiated conservation drug synthesis may be use this review approaches in future studies and formulate idea.

REFERENCES

1. Yadav M, Chattejri S, Gupta SK, Watal G. Preliminary phytochemical screening of six medicinal plants used in traditional medicine. Int J Pharm Pharm Sci 2014;6(5):539-42.
2. Iwu M. Hand Book of African Medicinal Plants. Boca Raton, FL: CRC Press; 1993.
3. Schneider SH. The changing climate. Sci Am 1989;261:70-9.
4. Hamburg SP, Harris N, Jaeger K, Karl TR, McFarland M, Mitchell JF. Common questions about climate change. United Nations Environment Programme. USA: World Meteorology Organization; 1997.
5. Ravikanth S, Sivaraj C, Seeni S, Joseph J, Raaman N. Antioxidant activities and phytochemical analysis of methanol extract of leaves of Hypericum hookerianum. Int J Pharm Pharm Sci 2014;6(4):456-60.
6. Agrawal VS. Economics plants of India. Bot Survey India 1986;161:2-9.
7. Gayathri GA, Gayathri M. Preliminary qualitative phytochemical screening and in vitro hypoglycemic potential of Acanthus ilicifolius and evolvolus emarginatus. Int J Pharm Pharm Sci 2014;6(6):362-5.
8. Bulletin of the World Health Organization (WHO). Vol. 80. July 2002, p. 7.
9. Amalraj A, Pius A. Bioavailability of calcium and its absorption inhibitors in raw and cooked green leafy vegetables commonly consumed in India – An in vitro study. Int J Food Chem 2015;170:430-6.
10. Mandal V, Mohanand Y, Hemalatha S. Microwave assisted extraction – An innovative and promising extraction tool for medicinal plant research. Pharmacogn Rev 2007;1(7):8-7.
11. Krishnaiah D, Sarbathy R, Bono A. Phytochemical antioxidants for health and medicine: A move towards nature. Biotechnol Mol Biol Rev 2007;1(4):97-114.

Table 1: P. alba classification

| Kingdom   | Plantae         |
|-----------|----------------|
| Phylum    | Tracheophyta   |
| Class     | Magnolopsida   |
| Order     | Caryophyllales |
| Family    | Nyctaginaceae  |
| Genuss    | Pisonia        |
| Species   | P. alba        |

Table 2: Phytomedicine studies of P. alba

| S. No | Phytomedicine studies | References |
|-------|-----------------------|------------|
| 1.    | Analgesic, anti-inflammatory | [35-37]     |
| 2.    | Hypoglycemic agent      | [7,21,38-40] |
| 3.    | Antifungal              | [20,23]     |
| 4.    | Wound healing           | [46]        |
| 5.    | Rheumatism and arthritis| [33]        |
| 6.    | Histological            | [47]        |
| 7.    | Antidiabetic             | [22,31,38,41,48] |
| 8.    | Antioxidant             | [5,11,44,45,49,53] |
| 9.    | Biochemical             | [42,38]     |
| 10.   | Thyroid hormone studies  | [43]        |
| 11.   | Microbial studies        | [23,24,27]  |
| 12.   | Blood glucose            | [11,56]     |
| 13.   | Enzyme activity          | [50]        |

Fig. 1: Pisonia alba plant
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12. Jagadishchandra KS, Rachappaji S, Gowda KR Tharasaraswathi KJ. In vitro propagation of Pisonia alba (L.) Spangoe (Lettuce tree) a threatened species. Phytomorphology 1999;49(1):83-7.

13. Levin RA, Raguso RA, McDee LA. Fragrance chemistry and pollinator affinities in Nyctaginaceae. Phytochemistry 2001;58(3):429-40.

14. Grant V, Grant KA. Hawkmoth pollination of Mirabilis longiflora (Nyctaginaceae). Proc Natl Acad Sci U S A 1983;80:1298-9.

15. Rawat AK, Mehrotra S, Tripathi SC, Shome U. Hepatoprotective activity of Boerhaavia diffusa L. roots – a popular Indian ethnomedicine. J Ethnopharmacol 1997;56(1):61-6.

16. Chude MA, Orisakwe OE, Afonne OJ, Gamanl KS, Vongtau PH, Obi E. Hypoglycaemic effect of the aqueous extract of Boerhaavia diffusa leaves. Indian J Pharmaco 2001;33:21-6.

17. Hilou A. Known and potential antineoplastic agents. Phytother Res 2015;34(1):194-6.

18. Khan MS, Ansari IA, Ahmad S, Akhter F, Hashim A, Srivastava AK. Therapeutic efficacy of Mirabilis jalapa against atrazine toxicity on biochemical parameters in the liver tissue of albino wistar rat Rattus norvegicus. Life Sci Arch 2015;1(5):358-364.

19. Revathi A, Pugazhendy K, Jayanthi C. Antioxidant activity of Pisonia alba against atrazine toxicity on liver tissue of albino wistar rat Rattus norvegicus. Indo Asian J Multidiscip Res 2016;1(4):1343-9.

20. Rajeswari P, Krishnakumari KR. Phytochemicals as antioxidants and antidiabetics. J Pharm Sci Res 2010;2(11):728-33.

21. Narayanay CR, Joshi DD, Mujumdar AM. A review on role of plant(s) extracts and its phytochemicals for the management of diabetes. J Diabetes Metab 2015;6:565.

22. Hilou A. Known and potential antineoplastic agents. Phytother Res 2015;34(1):194-6.

23. Hilou A. Known and potential antineoplastic agents. Phytother Res 2015;34(1):194-6.

24. Prabhu D, Nappinnai M. Antioxidant and free radical scavenging activities of common wild greens from tropical and subtropical regions. Food Chem 2009;115:1213-20.

25. Vidyalakshmi A, Divya CV. New report of Colletotrichum gloeosporioides causing anthracnose of Pisonia alba in India. Arch Phytopathol PI Prot 2013;46:201-4.

26. Sastry R, Pugazhendy K, Revathi A, Prabakaran S, Murugan K, Hwang JS. Convalesce consequence of Pisonia alba against atrazine toxicity in liver tissue of Rattus norvegicus. J AdvLife Sci 2015;8(1):10-9.

27. Kalaichellvan V. Effect of ethanolic extract of Pisonia alba Span. leaves on blood glucose levels and histological changes in tissues of alloxan-induced diabetic rats. J Asia Pac Entomol 2002;5:227-31.

28. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

29. Singhla A, Bawa B, Choudhary MD. Hepatoprotective and antipyretic effect of bark of Nuxtanthus arbor-tristis Linn. J Pharm Sci Res 2011;5(24):2694-7.

30. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

31. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

32. Vidyalakshmi A, Divya CV. New report of Colletotrichum gloeosporioides causing anthracnose of Pisonia alba in India. Arch Phytopathol PI Prot 2013;46:201-4.

33. Prabhu D, Nappinnai M. Antioxidant and free radical scavenging activities of common wild greens from tropical and subtropical regions. Food Chem 2009;115:1213-20.

34. Prabakaran S, Pugazhendy K, Revathi A, Jayanthi C. Antioxidant activity of Pisonia alba against atrazine toxicity on liver tissue of Rattus norvegicus. J AdvLife Sci 2015;8(1):10-9.

35. Vidyalakshmi A, Divya CV. New report of Colletotrichum gloeosporioides causing anthracnose of Pisonia alba in India. Arch Phytopathol PI Prot 2013;46:201-4.

36. Sastry R, Pugazhendy K, Revathi A, Prabakaran S, Murugan K, Hwang JS. Convalesce consequence of Pisonia alba against atrazine toxicity in liver tissue of Rattus norvegicus. J AdvLife Sci 2015;8(1):10-9.

37. Kalaichellvan V. Effect of ethanolic extract of Pisonia alba Span. leaves on blood glucose levels and histological changes in tissues of alloxan-induced diabetic rats. J Asia Pac Entomol 2002;5:227-31.

38. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

39. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

40. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

41. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.

42. Sumithra P, Varalakshmi S, Devasana K. Phytochemical analysis and antibacterial activity of Mirabilis jalapa flower against gastrointestinal pathogens. Indian J Res Sci 2014;3(12):1167-70.