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Phytochemical and Pharmacological review on *Plumeria pudica* Jacq.

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Abstract

Plumeria pudica Jacq. Commonly known as nag champa belongs to family Apocynaceae. The plant is native to India and various parts of the plant has been used for the treatment of several diseases. A Genus *Plumeria* (Apocynaceae) contain largely of shrubs or flowering trees which are grown throughout the tropical region including many parts of India. The plants are well known for their religious value, cosmetic importance and tremendous potential to be used as medicinal agents to cure infections, digestive diseases, anti-inflammatory and antipyretic action, anti-tumor potential, anti-oxidant properties etc. The article highlights the phytochemicals and pharmacological activities of the plant.

Key words: Phytochemical, Pharmacology, *Plumeria pudica* Jacq.

Introduction

Plumeria pudica is a species of the genus *Plumeria* belonging to family Apocynaceae, native to Panama, Colombia and Venezuela commonly known as Nag champa due to leaves in the shape of a cobra's hood, and its flowers are white with a yellow center. The plant is a Small tree, leaves in distinct fiddle shape with 2 lobes in the middle. Flowers white with yellow throat, bloom in bunches like a bouquet thus the common name 'Bridal Bouquet'. Blooming occurs all year round and blooming period usually long. Prone to attack by mealy bugs and frangipani caterpillars and affected by rust fungus that speeds up leaf loss. When injured, plant secretes white milky sap that is slightly poisonous. [1]

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Fig. 1: *Plumeria pudica* Jacq. Plant

Phytochemicals

Plumeria species have also been investigated for isolation of irridoids and triterpenoids, which exhibited algicidal, antibacterial and cytotoxic activities. Iridoid glycosides were the first medicinally active compounds isolated from the species of Plumeria. Subsequently the latex and oil of some of these species were found to have other medicinally active constituents like sterols, carbohydrates, tannins, triterpenoids and alkaloids. Some other important constituents are 27.0% to 34.0% of Benzyl salicylate, 8.0% to 22.0% of benzyl benzoate, 17.0% of traces of geraniol, 0.2% to 9.0% Geranyl linalool, 1.0% to 8.0% of tricosane, 8.0% of linalool, 4.0% to 7.0% nonadecane, 6.0% to 7.0% of nerolidol, and 0.3% to 4.0% of pentacosanehas identified in the vast phytoconstituents in Flower oil. [2-4]

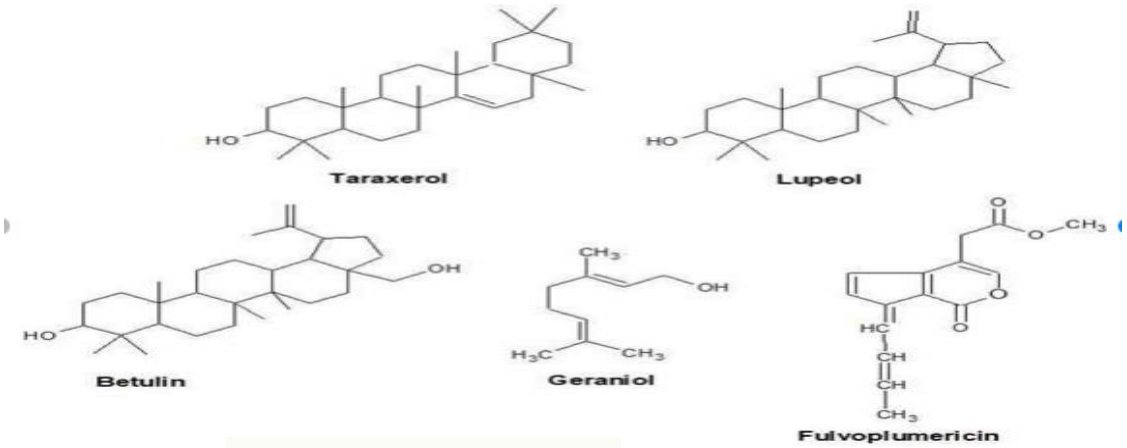

Fig. 2: Main phytochemicals of *Plumeria pudica* Jacq.

Pharmacological Activity

Plumeria pudica Linn. is a flowering plant of the family Apocynaceae. Different species of Plumeria are used for the cure of rheumatism, diarrhoea, blennorhea, venereal disease, leprosy, psychosis and diuresis etc. [5-14]

Antidiarrheal effect

Plumeria pudica plant is having wide use for controlling chronic diarrhoea and dysentery due to protein fraction water soluble Plumeria pudica (LPPp), which is tested in various models such as diarrhoea persuaded through castor oil, cholera toxin or prostaglandin E2 (PGE2). Water soluble protein element. Plumeria pudica was tested with different doses has significantly inhibited the diarrhoeal stools, intestinal motility, and intestinal fluid accumulation along with intestinal transit. LPPp has prevented the alterations in glutathione and malondialdehyde. Presence of proteinases, proteinase inhibitors in Plumeria pudica latex, has inhibited the seriousness of diarrhoea of rodents caused by castor oil as well as cholera toxin also it's related with LPPp anti-inflammatory qualities. The antidiarrheal consequence of Plumeria pudica latex (LPPp) was because of protection of intestinal inflammatory details of oxidative stress.

Anthelmintic activity

Plumeria pudica leaves have the excellent antihelminthic activity against Indian earthworm Pheretimaposthuma by using various extracts. From the results, it is observed that Plumeria pudica shown potent anti-helmintic activity while the P. posthuma has taken a long time for death (190 min–110 min) of worms. The angleworm chosen for the anthelmintic activity was maximum delicate towards the different solvent excerpts, namely petroleum ether, ethyl acetate, chloroform and methanol. The anthelmintic activity result revealed dose-dependent paralysis range starts with motility loss and then leads to response loss towards outer stimuli, that finally progressed to destruction at 10 mg/ml as well as 20 mg/ml concentrations, paralysis, was observed, respectively, at 110 min and 90 min and death at

130 min and 120 min in methanol extracts. It was concluded that petroleum ether, ethyl acetate, chloroform and methanol excerpts of Plumeria pudica leaves exhibited the dosedependent anti-helminthic activity.

Gynaecological disorders

Every women suffers with a gynaecological disorders such as vaginal infection, menstrual problems etc. The infection was more in rural areas because of non-hygienic conditions, life style and their food habits. In India so many medicinal plants are used in ayurveda which do not have any toxicity or less toxic compared to synthetic drugs. In order to use in a better way the drugs are to be standardized and validated with established methods. In the present study plumeria pudica and other three herbs play an important role to cure the gynaecological disorders in medication conventional system.

Anti-inflammatory and nociceptive activities

Plumeria pudica plant has the Anti-inflammatory and nociceptive properties. The plumeria pudica jacq latex was assessed for anti-inflammatory activity against paw edema evoked through Carrageenan and edema evoked through dextran, histamine, serotonin, bradykinin, prostaglandin E2. Intraperitoneal authority of various prescriptions related to plumeria pudica jacq latex has significantly reduced the paw volume in paw edema evoked through Carrageenan which is due to reduction in myeloperoxidase activity. The latex has also compact the leukocyte peritoneal migration evoked through Carrageenan as well as decrease of IL-1 and TNF-α in peritoneal fluid. It also compact the animal abdominal contraction evoked through acetic acid along with paw licking model evoked through formalin. The results are the clear evidence that latex fluids present in Plumeria pudica consists of rich amino acids having strong medicinal advantages

Ulcerative colitis

Apart from the anti-inflammatory properties, Plumeria pudica has protective properties in animals against inflammatory ulcerative colitis which relates to instigative intestinal sickness. In this study ulcerative colitis was induced by 6 % acetic acid solution which is given through intracolonic instillation in mice. Simultaneously Latex proteins from P. pudica (LPPp) were administered. After eight hours of acetic acid administration mice were subjected to euthanasia and the colons were excised for the determination of "the wet weight, macroscopic as well as microscopic lesion scores, myeloperoxidase (MPO) activity, IL1-β levels, glutathione (GSH) and malondialdehyde (MDA) concentration and superoxide dismutase (SOD) activity." The outcomes stated that Latex proteins from P. pudica (40 mg/kg) have antifouling result against acetic acid evoked ulcerative colitis. The medication with LPPp has also lowered the levels of cytokine IL-1β, adding to the decrease of colon inflammation. The above evidences and information propose that LPPp has an antifouling effect contrary to enteral harm directed by processes which include the organic process of inflammatory cell incursion, cytokine freeing and oxidative stress.

Alzheimer's disease

Alzheimer disease which falls under category of neurodegenerative condition caused due to increased levels of acetylcholine esterase. The AChE enzyme works towards the degradation of the "neurotransmitter acetylcholine (Ach) in to acetic acid and choline and affects the nerve transmission." It's treatment includes the suppression of the act of AChE, that causes alteration in the neurotransmission .Plants contains AChE by nature. "Methanolic extract of the leaves of Plumeria pudica was tested for AChE inhibitors for the brain homogenate of the zebrafish (Daniorerio). Through titri-metric investigation of the AChE in in-vitro as well as in-vivo conditions" the act was listed. The results stated that the methanolic excerpt of Plumeria pudica cuts down the act of AChE.

Anti-leishmanial activity Plumeria pudica plant leaves have the antileishmanial activity. P. pudica leaf was assessed contrary to Leishmanial" donovani (strain AG 83) promastigotes by in vitro promastigotes cell toxicity assay through taking MTT (3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyltetrazoliumbromide)." The in vitro antileishmanial activity of petroleum ether, chloroform as well as methanol extracts from P. pudica leaf was assessed contrary to Leishmanil donovani (strain AG 83). All the excerpts were considerably constrained the growth of L.

Donovani promastigotes in vitro in a dose reliant way. *Plumeria pudica* plant leaves exhibited considerable in vitro antileishmanial activity contrary to Leishmanial donovani promastigotes.

References

1. Shinde P.R.,Patil P.S. and Bairagi V. A. (2014).Phytopharmacological Review of Plumeria species,Scholars Academy Jounral of Pharmacy, 3(2): 217-227.
2. Balunas, M.J. and Kinghorn, A.D. (2005). Drug Discovery from Medicinal Plants. Life Sciences. 78(5): 431-41.
3. Choudhary M., Kumar V. and Singh S. (2014). Phytochemical and Pharmacological activity of GenusPlumiera, International Journal of Biomedical And Advance Research, 5(6) : 266-267.
4. Chowdary, M.; Kumar, V. and Singh, S. (2014). Phytochemical and Pharmacological activity of Genus Plumeria: An updated review. International Journal of Biomedical and Advance Research, 5(6): 267-271.
5. Chanaka, P.W.W.; Viraj, M.P.M.; Philip, M.; Rani, J.S. and Guru, P.R. (2016). Extraction of acetylcholine esterase inhibitors from plumeria pudica and analyzing its activity on zebrafish brain. World Journal of Pharmacy and Pharmaceutical Sciences, 5(4): 1781-91.
6. Devprakash, T.R.; Gurav, S. and Kumar, S.G.P. (2015). Mani T.A review of phytochemical constituents & pharmacological activity of plumeria species. International Journal of Current Pharmaceutical Research. International Journal of Current Pharmaceutical Research, 4(1): 1-6.
7. Duff, D. (2014). Plant of the Month for August 2014 – Plumeria Pudica. Special to West Hawaii Today. August 3, 2014.
8. Fernandesa, H.B.; Machadoa, D.L.; Diasb, J.M.; Britob, T.V. and Jalles, A.B. (2015). Laticifer proteins from Plumeria pudica inhibit the inflammatory and nociceptive responses by decreasing the action of inflammatory mediators and pro-inflammatory cytokines. Revista Brasileira de Farmacognosia, 25(3): 269-277.
9. Gupta, M.; Rakhi, Y.N.; Pinky, S. et al. (2016). Phytochemical screening of leaves of Plumeria alba and Plumeria acuminate. Journal of Chemical and Pharmaceutical Research, 8(5): 354-358.
10. Kumawat, P.; Neetu, S. and Sumeet, D. (2019). Ethno medicinal and Pharmacological importance of Plumeria pudica Linn. International Journal of Pharmacy & Life Sciences. 10(3): 8-28.
11. Oliveiraa, N.V.M.; Souzaa, B.S.; Moitaa, M.A.; Oliveiraa, L.E.S. and Britoa, F.C. (2019). Proteins from Plumeria pudica latex exhibit protective effect in acetic acid induced colitis in mice by inhibition of proinflammatory mechanisms and oxidative stress. Life Sciences. 231(15): 116535.
12. Radhika, B. (2019). Anti-Helminthic Activity of Plumeria pudica Leaves. Journal of. Chemistry. And Pharmaceutical. Research, 11(2): 6-12.
13. Santana, L.A.B.; Sousab, N.A.; Kelves, L.; Souza, M.; Sousab, N.A. and Souzab, L.K.M. (2018). Antidiarrheal effects of water-soluble proteins from Plumeria pudica latex in mice. Biomedicine & Pharmacotherapy. 97: 1147–1154.
14. Suarez, S.N.; Sanahuja, G.; Lopez, P. and Caldwell, D.L. (2017). First confirmed report of powdery mildew (Erysiphe sp.) on Plumeria pudica in the United States. New Disease Reports. 36: 3.

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