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Review Article

Antidiabetic Activity of Catharsntus Pusillus: A Review

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Abstract:
Native to India, Caesalpinia pulcherrima Swartz, also known as Guletura, is widely distributed in South India and is used in Indian medicine for its leaves, flowers, bark, and seeds. Numerous active elemental fractions, including flavonoids, carotenoids, glycosides, peltogynoids, phenols, sitosterol, pulcherrimin, lupeol, lupeol acetate, myricetin, quercetin, and rutin, as well as caesalpin-type diterpenoids, are present in the plant. The goal of the current study was to evaluate the anti-anxiety effects of several leaf extracts from Caesalpinia pulcherrima, including n-hexane, chloroform, ethyl acetate, and methanol, using albino mice and the elevated plus maze (EPM) model. Different dosages of the extracts (200 and 400 mg/kg) were administered orally to albino mice, and their behavior was monitored using the EPM. Standard (positive control) dosage was 2 mg/kg of benzodiazepines (P.O.). The results were similar to those of the common antianxiety medication diazepam (2 mg/kg), indicating that the methanol extract of Caesalpinia leaves demonstrated a maximum and significant dose-dependent effect on EPM at 200 and 400 mg/kg. Two distinct dosages of Caesalpinia pulcherrima (200 and 400 mg/kg) in the Actophoptometer model demonstrated a dose-dependent reduction in locomotor activity in comparison to the control animals. The presence of polyphenols in the methanol extract, as revealed by the phytochemical screening, may account for C. pulcherrima's anxiolytic potential. Therefore, this plant may also be developed as a possible effective anti-anxiety medication.
Keywords: Caesalpinia Pulcherrima, Albino Mice, Actophoptometer, Pulcherrimin, Myricetin

Introduction

Instead of traditional psychiatric symptoms, patients frequently arrive with somatic complaints. Furthermore, in this group of patients, anxiety and depression significantly overlap. Patients with coexisting disorders have a worse prognosis than those with either disorder alone, and coexisting anxiety and depression are frequently more resistant to pharmaceutical treatment. Thankfully, a plethora of novel treatments are at the physician's disposal to help with the management of these patients. Particularly the more recent antidepressants are

becoming more and more significant in the treatment of anxiety disorders on their own as well as comorbid depression and anxiety. Our treatment goal can now include sustained complete remission in addition to improvement thanks to these new options. Of the newer agents, the selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors have been studied quite extensively in these patient populations. The specific profiles of individual agents may assist the clinician in individualizing treatment.

Extreme sadness and despair, a sluggish mind and difficulty concentrating, pessimistic worry, a lack of enjoyment, self-deprecation, and fluctuating agitation or hostility are all signs of major depression. Additionally, there are physical changes, especially in cases of severe, vital, or melancholic depression. These symptoms include hypersomnia or insomnia; changes in eating habits, such as anorexia, weight loss, or overeating; low libido and energy; and disturbances in the typical circadian and ultradian rhythms of activity, body temperature, and numerous endocrine processes. Other forms of depression include psychotic depression, postpartum depression, seasonal affective disorder, and dysthymic disorder, also known as dysthymia. Depression does not have a single recognized cause. Instead, a confluence of genetic, biochemical, environmental, and psychological factors most likely causes it. Some types of depression tend to run in families, suggesting a genetic link. However, depression can occur in people without family histories of depression as well.

Anxiety is a normal human emotion that everyone encounters at some point in their lives. The most prevalent psychological state issue in the world, anxiety is growing quickly. The prevalence of mental disorders is rising, and long-term use of synthetic pharmaceuticals prescribed by doctors has been linked to numerous serious side effects, including the potential for addiction. This helped researchers focus on sources of natural anxiety relief.

It can push us to face and overcome challenging situations that lead to psychological disturbances and unhealthy anxious disorders like phobias, panic attacks, and obsessional behaviors. The most prevalent and prevalent psychological state issue in the world is anxiety, and its prevalence is rising. Yet it remains under-reported, under-diagnosed, and undertreated. Benzodiazepines, being a big class of compounds used for the treatment of hysteria, present a narrow margin of safety between the anxiolytic effect and unwanted side effects, which has prompted researchers to gauge new compounds especially plant-based drugs having less undesirable effects.

The plant is used as a refresher, tonic, and analeptic. Bark is used as a substitute for leaves, and a leaf infusion is both cathartic and a substitute for leaves. Numerous active elemental fractions, including flavonoids, carotenoids, glycosides, peltogynoids, phenols, steroids, caesalpin-type terpenoids, sitosterol, pulcherrimin, lupeol, lupeol acetate, myricetin, quercetin, and rutin.

Effect of plant extract on acute toxicity studies: The acute toxicity test using the 423 guidelines at an oral limit doses of 5, 50, 500 and 2000mg/kg of the aqueous extract of C. pulcherrima caused no death in the mice. From the acute toxicity studies found that all the compounds not showed any toxicity signs during the period. Pharmacological activity: The anti-anxiety activity of Caesalpinia pulcherima was evaluated by employing a widely used model i.e. elevated plus-maze22 and locomotor activity. The mean number entries into open arms and time spent into open arms by mice after oral administration of doses 200 mg/kg and 400mg/kg of all extracts.

Caesalpinia pulcherrima

Caesalpinia pulcherrima, commonly known as Pride of Barbados or Red Bird of Paradise, is a flowering plant that belongs to the legume family (Fabaceae). Here's a general overview of the microscopic, macroscopic, physiological

aspects, as well as the collection and extraction processes for Caesalpinia pulcherrima:

Microscopic Analysis:

1. Leaf Structure:
- Study the cellular arrangement in the leaf, including epidermal cells, stomata, and vascular bundles.
- Identify any specialized cells or structures unique to Caesalpinia pulcherrima.

Macroscopic Analysis:

1. Overall Plant Characteristics:
- Observe the plant's size, shape, color, and any distinctive features such as flowers and fruits.
- Note any specific characteristics that aid in identification, such as the unique structure of the flowers.

Physiological Analysis:

1. Metabolic Pathways:
- Investigate biochemical pathways, especially those related to the production of secondary metabolites, which may have medicinal or other properties.
2. Environmental Adaptations:
- Understand how Caesalpinia pulcherrima responds to various environmental conditions, which can provide insights into its cultivation requirements.

Collection of Plant:

1. Selection:
- Ensure accurate identification of Caesalpinia pulcherrima.
- Choose healthy specimens for collection.
2. Timing:
- Collect plant material at the appropriate time, considering the plant's life cycle and the highest concentration of bioactive compounds.
3. Parts Collected:
- Depending on the intended use, collect relevant plant parts, which may include leaves, flowers, or seeds.

Extraction Process:

1. Harvesting:
- Clean the collected plant material to remove any debris.
- Dry the plant material to preserve it for further processing.
2. Extraction Methods:
- Solvent Extraction: Use suitable solvents (e.g., ethanol, methanol) to extract bioactive compounds from the dried plant material.
- Steam Distillation: For obtaining essential oils, if applicable.
- Cold Press Extraction: For oils from seeds, if applicable.
3. Concentration and Purification:
- Concentrate the extract by removing excess solvent.
- Purify the extract if necessary, using techniques such as chromatography.
4. Analysis:
- Conduct chemical analysis to identify and quantify the compounds present in the extract.
- Perform quality control to ensure the extract meets standards.

Caesalpinia Pulcherrima

Chemical component:

Several valuable phytochemicals have been elicited from different parts of this plant such as the seeds have been found to contain neutral saponin, terpenoids, caesalpin, βcaesalpin, and α- caesalpin, seed Kernels are found to contain phytosterols- sitosterol, heptocosane noncrystalline, bitter glycoside, bonducin, neutral saponin, leaves are found to have pinitol, glucose, calcium, brazzillin, bark reveals the presence of homoisoflavonoids, 6-

Omethylcaesalpinianone, and caesalpinianone, roots elaborate cassane furanoditerpene, caesalpinin, bonducellpins A, B, C , D, and diosgenin.

Conclusion:

The present investigation reveals that the methanolic extract of T. indica manifested a maximum and significant dose-dependent effect at 200 and 400mg/kg in mice with the help of elevated plus-maze model and locomotor activity of anxiety. The studies are under progress to isolate bioactive constituent (s)/fraction from T. indica responsible for the anti-anxiety activity.

References

1. Griffiths RR, Ator NA, Roache JD, and Lamb RJ. Abuse liability of triazolam: experimental measurements in animals and humans. Psychopharmacol. 1987; 3 (5): 83-87.
2. Tamil selvan A, Suthakaran R, Muthu Vadivel SB, Kumara S. Purgative Activity of Caesalpinia pulcherrima (L) Sw leaves extracts. Research J. Pharmacology and Pharmacodynamics 2013; 5 (3):164-165.
3. Wadkar GH and Sayyad FJ. In-Vitro Anthelminthic activity of Caesalpinia bonducella root bark on Pheretima postuma and Ascaris gallis. Research Journal of Pharmacy and Technology 2014; 7(10): 1134-1136.
4. Balamurugan G, Muralidharan, Pandiselvi A, Amutha P. Preliminary Phytochemical screening and Anti-oxidant activities of Ethanolic extract of Caesalpinia sappan Linn. Research Journal of Pharmacy and Technology 2008; 1(3): 179-181.
5. Rasheed A, Senthilkumar KL, Rajkumar M. Antidiarrhoeal activity of bark extracts of Caesalpinia sappan. Linn. Research Journal of Pharmacology and Pharmacodynamics 2009; 1 (3): 128-129.
6. Ambasta SP. The wealth of India, raw materials. New Delhi: Publication and information directorate, CSIR: 1998; 3: 13-14.
7. Chakraborthy GS, Badujar RS, Pardeshi CR. Analgesic activity of chloroform extract of Caesalpinia pulcherrima. J Pharm Res. 2009; 2:1199–1200.
8. Gautam R, Saklani A, Jachak SM. Indian medicinal plants as a source of antimycobacterial agents. J Ethnopharmacol. 2007; 110(2): 200–234.
9. Chiang LC, Chiang W, Liu MC, Lin CC. In vitro antiviral activities of Caesalpinia pulcherrima and its related flavonoids. J Antimicrob Chemother. 2003; 52(2): 194–198.
10. Habibur R, Chinna Eswaraiah M, Anoosha T, Nagaveni K, Manjula K. Evaluation for CNS activities of hexane extracts of Citrullus lanatus seeds. Research Journal of Pharmacy and Technology 2013; 6(8): 878-884.
11. Balakrishna V, Senthil Kumar D, Lakshmi T. Tamarindus indica L. (Fabaceae): extent of explored use in traditional medicine. Asian journal of pharmaceutical and clinical research 2020; 13(3): 28-32.
12. Vaishnavi VR, Bhargavi T, Baba Shankar RG, Ram Mohan M, And Vasudha B. Isolation, Characterization, and Assessment for Central nervous system effects of novel Phyto molecule from Galphimia glauca Cav. Stems. Asian Journal of Chemistry 2019; 31(6): 1230-1236.
13. Trease EG and Evans WC. Textbook of Pharmacognosy, 12th eds. Alden Press, Singapore. 1983.
14. OECD Guidelines for the Testing of Chemicals (No. 423): Acute Oral Toxicity-Acute Toxic Class Method (Adopted on 17 December 2001).
15. Paladini AC, Marder M, Viola H, Wolfman C, Wasowski C, and Medina JH. Flavonoids and the central nervous system: from forgotten factors to potent anxiolytic compounds. J. Pharm. Pharmacol. 1999; 51(5): 519-526.
16. Halemani D. Evaluation of anti-anxiety activity of methanol extract of Aegle maemelos (Bael fruit tree) leaves in rats. IOSR-JDMS. 2015; 14(9): 01-5.

17. Ashwani Kumar, Jitender Singh, and Anupam Sharma. Comparative antianxiety activity evaluation of Argyreia speciosa Linn. (roots), Caesalpinia digyna rottler (roots), and Sphaeranthus indicus Linn. (flowers). International Journal of Pharmaceutical Sciences and Research. 2015; 6(10): 4226-4229.
18. Sachan NK, Verma S, Sachan AK, Hussain A. An investigation of antioxidant activity of Caesalpinia bonducella seeds. Annals of Pharmacy and Pharmacological Sciences. 1(2), 2010, 88-91.
19. Gaur RL, Sahoo MK, Dixit S, Fatma N, Rastogi S, Kulshreshtha DK, et al. Antifilarial activity of Caesalpinia bonducella against experimental filarial infection. Indian Journal of Medical Research. 128(1), 2008, 65-70.
20. Ali A, Venkat Rao N, Shalam M, Shivaraj GT, Shantakumar SM. Anticonvulsive effect of seed extract of Caesalpinia bonducella. Iranian Journal of Pharmacology and Therapeutics. 8(2), 2009, 51-5.
21. Billah MM, Islam R, Khatun H, Parvin S, Islam E, Islam SA. Antibacterial, antidiarrhoel and cytotoxic activities of methanol extract and its fractions of Caesalpinia bonducella (L) Roxb leaves. J of the International Society for Complementary Med Res. 13(1), 2013, 101.
22. Irshad S, Mehata A, Mehata P. Antimalarial activity of three Pakistan medicinal plants. Pak J of Pharmaceuticals Sciences. 24(4), 2011, 589-91.
23. Gupta M, Mazumder UK, Kumar RS, Sivakumar T, Vamsi ML. Antitumor activity and antioxidant status of Caesalpinia bonducella against Ehrlich ascites carcinoma 2in Swiss albino mice. J of Pharmacological Science. 94(2), 2004, 177-84.
24. Ansari JA, Ahmad S, Jameel M. Effect of Caesalpinia bonducella L. on ulcer and gastric secretions in pylorus legated rat model. Journal of Drug Delivery and Therapeutics. 2, 2012, 102-104.
25. Shukla S, Mehta A, John J, Mehta P, Vyas SP, Shukla S. Studies on immunomodulatory activities of ethanolic extract of Caesalpinia bonducella seeds. J of Ethno. 125(2), 2009, 252-256.
26. Nirmala R Kakade, Shirish S. Pingale, Manohar G. Chaskar. Phytochemical and pharmacological review of Caesalpinia bonducella. Int Res J of Pharmacy. 7(12), 2017, 12-17.
27. Handa SS and Kaul MK. Supplement to cultivation and utilization of medicinal plants, RRL, Jammu-Tawi, 1996, 727-737.