

A Review on Anxiolytic and Antidepressant Activities of Medicinal Plants

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ABSTRACT

Anxiety and depression are prevalent mental health disorders that significantly impact individuals' quality of life and pose a substantial socioeconomic burden. While current pharmaceutical treatments, such as benzodiazepines and selective serotonin reuptake inhibitors, can be effective, they often have side effects, risk of dependence, and delayed therapeutic onset. Medicinal plants have gained interest as potential alternative or complementary treatments for anxiety and depression due to their fewer adverse effects, better patient acceptability, and multiple bioactive constituents offering multi-target mechanisms of action. *Passiflora incarnata*, *Valeriana officinalis*, *Matricaria chamomilla*, and *Lavandula angustifolia* have demonstrated notable anxiolytic properties through modulation of neurotransmitter systems, including GABAergic and serotonergic pathways. *Hypericum perforatum*, *Rhodiola rosea*, *Withania somnifera*, and *Curcuma longa* have shown antidepressant effects via diverse mechanisms like monoamine reuptake inhibition, neuroprotection, and anti-inflammatory actions. Compared to conventional pharmaceuticals, medicinal plants generally offer a favorable safety profile, though caution is warranted regarding herb-drug interactions. Clinical evidence, while promising, is sometimes limited by variability in active constituents and methodological challenges, underscoring the necessity for more rigorous, large-scale clinical trials and standardized preparations. Future research should focus on elucidating precise pharmacological mechanisms, optimizing formulations, and integrating phytotherapy with mainstream mental health care to maximize therapeutic benefits while minimizing risks.

Keywords:- socioeconomic burden, Medicinal plants, optimizing formulations

INTRODUCTION

Anxiety and depression are among the most common mental health disorders worldwide, significantly impacting individuals' quality of life and posing a substantial socioeconomic burden. Anxiety is typically characterized by excessive worry, nervousness, and physiological symptoms such as increased heart rate and restlessness. Depression manifests as persistent feelings of sadness,

hopelessness, and a marked loss of interest or pleasure in activities. [1]

Current pharmaceutical treatments primarily include benzodiazepines for anxiety and selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants, and serotonin-norepinephrine reuptake inhibitors (SNRIs) for depression. While these medications can be effective, they often

come with drawbacks such as side effects (including drowsiness, sexual dysfunction, and weight gain), risk of dependence, and delayed therapeutic onset. Moreover, not all patients respond adequately to these therapies, which underscores the need for alternative or complementary treatment options [2].

In recent years, there has been growing interest in medicinal plants as potential sources of anxiolytic and antidepressant agents. These natural alternatives are often credited with fewer adverse effects, better patient acceptability, and multiple bioactive constituents offering multi-target mechanisms of action³. This review aims to provide a comprehensive overview of the current scientific evidence supporting the anxiolytic and antidepressant activities of medicinal plants, addressing their efficacy, safety, and future potential in mental health management.

METHODOLOGY

The literature search was conducted using electronic databases including PubMed, Scopus, and Web of Science. Keywords such as “anxiolytic,” “antidepressant,” “medicinal plants,” “phytotherapy,” “clinical trials,” and “preclinical studies” were employed to identify relevant articles published up to 2025. Only English-language, peer-reviewed publications were included.

Inclusion criteria comprised studies exploring the anxiolytic or antidepressant effects of medicinal plants in human clinical trials or animal models, comprehensive reviews with empirical data, and studies that discussed mechanisms of action or safety profiles. Excluded were studies without primary data, case reports, non-English literature, and those focusing exclusively on synthetic or isolated compounds unattached to a botanical source[5].

To evaluate the quality of evidence, clinical trials were assessed using the Cochrane risk of bias tool, with emphasis

on randomization, blinding, and control group adequacy. Preclinical studies were evaluated based on experimental design, sample size, and relevance of behavioral tests used. Data synthesis focused on identifying active compounds, mechanisms, and comparative efficacy[6].

OVERVIEW OF MEDICINAL PLANTS WITH ANXIOLYTIC PROPERTIES:

Several medicinal plants have demonstrated significant anxiolytic effects supported by both preclinical and clinical evidence. Among them,

***Passiflora incarnata* (F. No. 1 passionflower)** has been shown to produce anxiolytic effects through modulation of the GABAergic system, with flavonoids such as apigenin playing a crucial role. Clinical trials have reported reduced anxiety symptoms with passionflower extracts and good tolerability.

***Valeriana officinalis* (F. No. 2 valerian)** is another widely studied plant known for its calming properties attributed to valerenic acid and other sesquiterpenes. Its mechanism involves interaction with GABA receptors, enhancing inhibitory neurotransmission. Meta-analyses of clinical studies show valerian’s efficacy in reducing generalized anxiety symptoms and improving sleep quality.

Matricaria chamomilla* (F. No. 3 chamomile)** and ***Lavandula angustifolia (lavender) contain essential oils like linalool and linalyl acetate; these compounds exhibit anxiolytic effects by modulating serotonin receptors and attenuating hypothalamic-pituitary-adrenal (HPA) axis activation. Both plants have demonstrated anxiolytic effects in animal models and clinical settings[9].

Further plants like ***Passiflora***, ***Humulus lupulus*** (hops), and ***Scutellaria lateriflora*** (skullcap) contribute to the diversity of anxiolytic phytotherapeutics. Evidence suggests these plants exert effects through multiple neurotransmitter

systems including GABAergic, serotonergic, and dopaminergic pathways,

offering a broad spectrum of anxiolytic mechanisms[10]



OVERVIEW OF MEDICINAL PLANTS WITH ANTIDEPRESSANT PROPERTIES:

In the realm of antidepressant natural products, *Hypericum perforatum* (St. John's Wort) is the most extensively studied. Its biologically active compounds, notably hypericin and hyperforin, inhibit the reuptake of serotonin, dopamine, and norepinephrine, thus enhancing monoaminergic transmission. Numerous high-quality clinical trials have demonstrated its efficacy in mild to moderate depression, with fewer side effects than conventional antidepressants [11,12]

***Rhodiola rosea* (F. No. 4)** exhibits adaptogenic and antidepressant properties, primarily through rosavins and salidroside, which modulate serotonin and dopamine levels and exert antioxidant effects. Clinical and preclinical studies report improved mood, reduced fatigue, and

enhanced cognitive function with rhodiola supplementation[13].

***Withania somnifera* (F. No. 5 ashwagandha)**, rich in withanolides, has shown anxiolytic and antidepressant effects, likely through modulation of the HPA axis and neuroinflammation reduction. Clinical trials indicate improvements in stress resilience and depressive symptoms.

***Curcuma longa* (F.No.6 turmeric)** and its active compound curcumin possess anti-inflammatory and neuroprotective properties. By inhibiting pro-inflammatory cytokines and enhancing brain-derived neurotrophic factor (BDNF) expression, curcumin has shown promise in depressive disorders, particularly as an adjunct therapy[13]. These plants exhibit antidepressant effects through multitargeted mechanisms including monoamine modulation, neuroprotection, anti-inflammatory action, and neurogenesis stimulation.



COMPARATIVE ANALYSIS

When comparing efficacy, *Hypericum perforatum* stands out with evidence comparable to standard antidepressants in mild to moderate depression [11].

For anxiolytic activity, *Passiflora* and *Valeriana* appear most effective clinically.

While synthetic pharmaceuticals often act on single targets, medicinal plants offer multi-target effects which may reduce side effects and improve symptom clusters. Synergistic effects are observed in polyherbal formulations combining plants with complementary mechanisms, such as valerian-lavender mixtures enhancing GABAergic activity alongside serotonergic modulation[8,9].

This combinatorial approach may offer broader symptom relief with reduced dosages.

Natural remedies tend to have slower onset and generally lower potency than pharmaceuticals but benefit from improved tolerability and reduced dependency risk.

The balance between efficacy and safety supports their use, particularly for mild symptoms or as adjunct treatments.

SAFETY AND SIDE EFFECTS

Medicinal plants used for anxiety and depression generally have favorable safety profiles. Common mild side effects include gastrointestinal discomfort, dizziness, or sedation[16]. However, *Hypericum perforatum* is notable for causing photosensitivity and interfering with cytochrome P450 enzymes, leading to potentially serious herb-drug interactions with medications such as warfarin, immunosuppressants, and contraceptives[17].

Contraindications exist for some herbs during pregnancy, lactation, or in certain medical conditions. Patients are advised to consult healthcare providers before use, especially when on concurrent

pharmacotherapy, to mitigate risks of interactions and adverse effects.

CHALLENGES AND LIMITATIONS

The primary challenges in medicinal plant research include variability in active compound concentration due to differences in cultivation, harvesting, and extraction processes, which complicates standardization and dosage determination[18]. Furthermore, many studies suffer from small sample sizes, lack of placebo controls, and short durations, limiting generalizability[19].

There is an urgent need for rigorous, large-scale clinical trials with standardized extracts to validate efficacy and safety. Additionally, more research is necessary to understand pharmacokinetics, long-term effects, and mechanisms in diverse populations[20]

FUTURE DIRECTIONS

Future research should prioritize multicenter, randomized controlled trials to establish robust clinical evidence[21]. Identification and isolation of novel bioactive compounds from medicinal plants hold promise for developing new anxiolytic and antidepressant drugs with improved safety and efficacy profiles.

Integration of medicinal plants into conventional mental health care requires developing standardized formulations, clear dosing guidelines, and educational efforts for practitioners and patients[22]. Exploring synergistic combinations and personalized phytotherapy may optimize therapeutic outcomes and patient adherence[23].

CONCLUSION

Medicinal plants hold significant promise as alternative or complementary therapies for anxiety and depression, two of the most prevalent and debilitating mental health disorders worldwide[1] Plants such as *Passiflora incarnata*, *Valeriana*

officinalis, *Matricaria chamomilla*, and *Lavandula angustifolia* have demonstrated notable anxiolytic properties through modulation of neurotransmitter systems, including GABAergic and serotonergic pathways[7,9,10]. Similarly, *Hypericum perforatum*, *Rhodiola rosea*, *Withania somnifera*, and *Curcuma longa* have shown antidepressant effects via diverse mechanisms like monoamine reuptake inhibition, neuroprotection, and anti-inflammatory actions[11,13,15]

Compared to conventional pharmaceuticals, medicinal plants generally offer a favorable safety profile, though caution is warranted regarding herb-drug interactions, particularly with *Hypericum perforatum*[16,17]. Clinical evidence, while promising, is sometimes limited by variability in active constituents and methodological challenges, underscoring the necessity for more rigorous, large-scale clinical trials and standardized preparations[18,19].

Future research should focus on elucidating precise pharmacological mechanisms, optimizing formulations, and integrating phytotherapy with mainstream mental health care to maximize therapeutic benefits while minimizing risks[21,22]. Synergistic combinations and personalized approaches to plant-based therapy may enhance efficacy and patient adherence, ultimately contributing to better management of anxiety and depression on a global scale[23].

This balanced consideration of efficacy, safety, and research gaps supports the growing role of medicinal plants as valuable agents in mental health treatment paradigms.

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