

Review

Phytotherapy for Anxiety: A Narrative Review of Efficacy, Mechanisms and Clinical Considerations.

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Abstract

Background: Anxiety disorders are among the most prevalent mental health conditions worldwide, and current pharmacological treatments, although effective, are often associated with adverse effects and incomplete symptom remission. These limitations have intensified interest in complementary and alternative therapeutic approaches, including herbal medicine.

Objective: This narrative review examines the evidence supporting the use of medicinal plants for the management of anxiety, highlighting their mechanisms of action, clinical efficacy and safety considerations.

Methods: A search of the scientific literature was conducted to identify studies investigating medicinal plants traditionally used for anxiety treatment. Particular attention was given to findings related to phytochemical activity within the central nervous system, clinical outcomes and reported adverse effects.

Results: Several plants, including *Valeriana officinalis*, *Passiflora incarnata*, *Melissa officinalis*, *Matricaria chamomilla* L., *Withania somnifera* and *Lavandula angustifolia*, demonstrate anxiolytic effects supported by preclinical and clinical evidence. Their primary mechanisms involve modulation of GABAergic neurotransmission, alongside antioxidant and anti-inflammatory pathways. Despite these promising results, the literature shows considerable variability in study design, formulation standardisation and sample size, limiting the generalisability of findings.

Conclusions: Herbal medicine presents a valuable complementary approach to anxiety management, offering potential therapeutic benefits with generally favourable safety profiles. Nevertheless, further high-quality, standardised clinical trials are necessary to confirm efficacy, establish optimal dosages and ensure long-term safety. Integrating herbal therapies into broader healthcare frameworks requires strengthened regulation, professional training and informed public use.

Keywords: Anxiety; Herbal Medicine; Phytotherapy; Anxiolytic Plants; GABAergic Activity; Complementary Therapies.

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1. Background

Anxiety is a psychological condition and one of the most prevalent today, affecting millions of people worldwide and negatively influencing their quality of life (QoL). According to Lobo ¹, in Portugal, one in every five people suffers from some psychiatric disorder, with anxiety disorders being the most prevalent. Globally, Fernandes *et al.* ², drawing on data from the World Health Organization (WHO), report that the worldwide prevalence of anxiety disorder is 3.6%, reflecting the dynamics of contemporary society. Although several conventional therapeutic approaches exist for the treatment of anxiety, such as psychotherapy and pharmacology ³, these therapies are not always effective and may also entail undesirable side effects, for example, those arising from pharmacological

treatment. Given this scenario, interest in complementary and integrative approaches has been increasing. For example, Chinese herbal medicine is one of the pillars of Traditional Chinese Medicine (TCM) and uses medicinal herbs in order to restore energetic and functional balance in the body. That is, it forms part of an ancient medical system and is characterised by the use of leaves, flowers, fruits, roots, plant barks and minerals for therapeutic purposes ⁴⁻⁶.

Thus, in view of the increasing demand for safe and effective therapeutic alternatives, and given that anxiety is a disorder with high prevalence both globally and nationally, it is understood that studying the role of herbal medicine in the treatment of anxiety is pertinent. Therefore, this study reviews the efficacy, mechanisms and clinical considerations relevant to the topic.

2. The case of Traditional Chinese Medicine

TCM is a science with centuries of history and is grounded in knowledge based on accumulated empirical experience ⁶. It begins from the theory that disease is the consequence of an imbalance of the vital force (*Qi*) throughout the body ⁷. *Qi* is the main substance of the universe and of the body ⁸; it is the “root” of the human being ⁹ and, together with the body, forms a single entity ¹⁰. *Xue* corresponds to blood, but it is a functional concept that differs from the understanding in conventional medicine and is associated with *Qi* ¹¹. *Yin-Yang* refers to the balance and harmony of the body ^{12,13}. Therefore, TCM is grounded in a holistic view of the human being, where the body is an integrated whole, providing a framework for prevention, diagnosis and treatment, based on various theories related to nature and the human body ⁹.

2.1. Diagnosis in TCM

Diagnosis is the essence of medicine and means to know or understand a patient; after deducing and comprehending knowledge about the patient and their disease, its nature and possible course are discovered ¹⁴. To perform diagnosis, some basic aspects must be taken into account: observing (*wàng*); listening and smelling (*wén*); assessing the patient's history (*wèn*); palpating the pulse, thorax and abdomen, various parts of the body, channels and points (*qiè*). After these initial observations, and in order to obtain a concrete diagnosis, there is a vast range of diagnostic techniques that may be used within TCM: evaluating the energy flow in each channel through palpation of the radial artery in six different positions; observing the face, eyes and tongue; superficially examining the ear; noting the sound of the patient's voice; palpating the body, particularly the abdomen; comparing temperatures in different parts of the body; and observing the vein of the index finger in small children. It should also be noted that everything that can be observed without instruments or invasive techniques, such as the patient's health history and main complaints, must be included in the diagnostic process ¹⁴⁻¹⁷.

2.2. Herbal Medicine as a TCM Treatment Technique

Herbal medicine is one of the main therapeutic techniques in TCM, and due to growing public awareness, it is increasingly sought as a therapeutic alternative or complement to Western medicine ^{18,19}. Regarding its role within TCM, herbal medicine is extremely relevant when compared with acupuncture (perhaps the most well-known TCM therapeutic technique), since Chinese herbalists use only herbal medicine to treat their patients, but most acupuncturists rely on herbal medicine to combine with acupuncture treatments. Therefore, herbal medicine treats diseases based on energetic patterns identified through diagnosis (e.g., spleen *Qi* deficiency), and herbal formulas are selected to correct these patterns and restore harmony between *Yin* and *Yang*, *Qi*, *Xue* and the internal organs. The main objectives of this therapeutic technique are as follows: proven clinical efficacy; safety of use; therapeutic individuality; promotion of health and disease prevention; holistic approach; sustainability and environmental respect; integration with other therapies.

2.3. Herbal Prescription

Once the diagnosis has been made and the patient's condition understood, the herbal therapist prescribes the formula most suited to the symptomatic picture, usually prescribing combinations of five to fifteen herbs, as single-herb formulas are rare in Chinese medicine. However, to prescribe herbal medicinal products it is necessary to possess legal authorisation and technical-scientific competence, thus avoiding exposing the patient to risks.

Therefore, herbal prescription may be explained as the process of identifying and guiding the use of medicines produced mainly from medicinal plants, ensuring safety, efficacy and quality in treatment. Treatment does not rely on a single consultation; patients must return at least every seven to fifteen days so that their condition can be reassessed and dosages adjusted if necessary ⁸. Herbal medicines may be used as complementary treatment for diseases, but in some cases may replace medications, provided that prescriptions are made responsibly and by a qualified professional ²⁰. Thus, herbal prescription involves correct identification of the plant, preparation/extract type, standardisation/quality, mode of use and suitability to each case.

2.4. Categories of Plants

Although some plants have more applications than others do, they all play a role, since removing one plant or altering the dosage results in a different formula with different energetic characteristics. For example, in Chinese Medicine, herbs have different flavours (pungent, sweet, bitter, salty, sour and bland) and are also classified according to temperature (hot, cold, warm, neutral, cool and intermediate), whereby hot diseases should be treated with cold herbs and cold diseases treated with hot herbs ²¹. There are 18 categories of plants, including: hot and cold herbs that release the exterior; herbs that drain fire (cold herbs); purgatives; herbs that regulate water and drain dampness; herbs that dispel wind and dampness; herbs that transform phlegm and stop cough; aromatic herbs that transform and dissolve dampness; herbs that relieve food stagnation; herbs that regulate *Qi*; herbs that regulate *Xue*; herbs that warm the interior and expel cold; tonics; astringent herbs and substances that stabilise and calm the spirit; herbs that nourish the heart and calm the spirit; aromatic substances that open the orifices; substances that extinguish wind and stop tremors; herbs that expel parasites; and substances for external application ^{22,23}.

3. Legal and clinical considerations in the use of Herbal medicine

3.1. Legislation on Herbal Medicine

Regarding the legislative framework governing the use of herbal medicine and the profession of herbal therapist, four main regulatory documents should be highlighted. Law No. 45/2003 of 22 August ²⁴, also known as the Basic Legal Framework for Non-Conventional Therapies, establishes the regulation of the activity and professional practice of non-conventional therapies. Law No. 71/2012 of 22 August ²⁵ regulates Law No. 45/2003 concerning the professional practice of non-conventional therapies, including herbal medicine (Article 2). Concerning the profession of herbal therapist, Ordinance No. 207-E/2014 of 8 October ²⁶ defines the characterisation and functional content of the profession. Finally, Ordinance No. 172-B/2015 of 5 June ²⁷ regulates the general requirements for the degree programme leading to a Bachelor's degree in Herbal Medicine.

3.2. Plant–Drug Interactions

Scientific publications in recent years have addressed interactions between phytochemical compounds (herbal medicine), drug-metabolising enzymes and physiological functions. Based on plants' ability to inhibit or induce certain metabolic enzymes and/or transport proteins, the potential risks of interaction between plants and medicines can be assessed ²⁸. Regarding these interactions, the study by focused exclusively on this subject

and presents numerous examples based on empirical evidence. Some of these examples are shown in the table below.

Table 1. Examples of plant–drug interactions according to Faustino ²⁸.

Medicine	Plant	Interaction
Paracetamol	Wu Wei Zi (<i>Fructus Schisandrae Chinensis</i>).	Decrease in side effects: gomisin A lignan may have a liver-protective effect; hyperkalaemia when used with high doses of potassium-sparing diuretics; reduced effect of sodium bicarbonate, aluminium hydroxide, antibiotics, reserpine, caffeine, opiates, scopolamine and berbamine.
General anaesthetics	Sheng Jiang (<i>Rhizoma Zingiberis Officinalis Recens</i>); Gan Jiang (<i>Rhizoma Zingiberis Officinalis</i>).	Reduction of side effects, decreasing nausea.
Aspirin	Gan Cao (<i>Radix Glycyrrhiza Uralensis</i>).	Reduction of side effects, decreasing gastrointestinal irritation.
Caffeine	Ma Huang (<i>Herba Ephedrae</i>)	Increases heart rate and blood pressure.
Chemotherapy	Yun Zhi (<i>Sclerotium Coriolus Versicolor</i>) Ci Wu Jia (<i>Radix Eleutherococcus Senticosus</i>)	Reduction of side effects, strengthening immune cell production and improving dendritic and cytotoxic T-cell tumour infiltration. Reduction of effects, decreasing immune system depression and therapy toxicity.
Epinephrine	Ma Huang (<i>Herba Ephedrae</i>)	Potentiates drug effect due to the plant's ephedrine content.
Heparin	Dan Shen (<i>Radix salviae miltiorrhizae</i>)	Potentiates drug effect by increasing heparin absorption.
Influenza vaccine	Ren Shen (<i>Radix panax ginseng</i>)	Enhances vaccination effects.
Insulin	Hu Lu Ba (<i>Semem trigonella foenum-graecum</i>)	Potentiates drug effects: plant reduces glycaemia, urinary sugar excretion, cholesterol and triglycerides.
Fenelzine	Ma Huang (<i>Herba Ephedrae</i>) Ren Shen (<i>Radix panax ginseng</i>)	Potentiates effects of ephedrine, as fenelzine inhibits ephedrine metabolism, leading to accumulation. Increases side effects (insomnia, headache, tremor). Mechanism unknown.

4. Anxiety

4.1. Anxiety Disorders and Diagnosis

In the literature addressing the topic, anxiety appears as an emotional state characterised by apprehension, worry or unease in the face of real or imagined threat. This state involves multiple components (emotional, cognitive, physiological and behavioural), which may be beneficial, promoting adaptation, or pathological when intense, persistent and disproportionate to the triggering stimulus ^{1,29}.

Thus, adaptive anxiety and pathological anxiety are distinguished. The former, healthy, can help motivate people to prepare, practise and train; it may also encourage appropriate caution in potentially dangerous situations ³⁰. Hence, it is described as the anticipation of future threat and being more frequently associated with muscle tension and vigilance in preparation for future danger and cautious or avoidant behaviours ³¹. As well, pathological anxiety, on the other hand, is a future-oriented emotion, marked by a sense of uncontrollability and unpredictability about potential aversive events ³². To determine whether anxiety is adaptive or pathological, Castillo *et al.* ³³ suggest evaluating the anxious reaction, whether it is short-lived, self-limited and related to the stimulus.

Therefore, anxiety is universal, as everyone has felt anxious at some point in their lives, and it may occur at different stages of life ³⁴. As a disorder, it is diagnosed regardless of age or gender and is not always easy to comprehend ³⁵. However, when it causes dysfunction and suffering in the individual, it becomes maladaptive and therefore a psychiatric

disorder³⁰. The diagnosis of any anxiety disorder is based on the characteristic signs and symptoms listed in the DSM-V (Diagnostic and Statistical Manual of Mental Disorders), but it may be suspected when: anxiety is highly distressing; anxiety interferes with functioning; anxiety does not resolve spontaneously within a few days; and other causes have not been identified³⁰.

According to the APA³¹, the different anxiety disorders are distinguished mainly by the stimuli or circumstances that trigger fear, anxiety or avoidance behaviours, as well as the types of thoughts and beliefs associated with them. The DSM-V presents diagnostic criteria, risk factors, prognosis, functional consequences and differential diagnosis for each type of anxiety disorder, considering as anxiety disorders: separation anxiety disorder; selective mutism; specific phobia; social anxiety disorder (social phobia); panic disorder; agoraphobia; generalised anxiety disorder (GAD); substance/medication-induced anxiety disorder; anxiety disorder due to another medical condition; other specified anxiety disorder; and unspecified anxiety disorder³¹.

4.2. Herbal Medicine in the Treatment of Anxiety

Concerning the use of medicinal plants for the treatment of anxiety, the studies by Assi *et al.*³⁶ and Georg Jensen *et al.*³⁷ are noteworthy. The former highlights the high prevalence of popular use of plants for anxiety treatment, but also the need for education to promote a better-informed population and regulation regarding plant use for this purpose. Georg Jensen *et al.*³⁷, in turn, report that in the Middle East and African regions there are plants with considerable potential for anxiety treatment, with antioxidant, anti-inflammatory and neurotransmitter-modulating mechanisms, but acknowledge that empirical evidence is limited due to small and poorly standardised studies. In other words, although medicinal plants of cultural importance are widely used, scientific rigour is lacking, and as previously mentioned, two of the seven pillars of herbal medicine are precisely proven clinical efficacy and safety of use. Moreover, these findings highlight the importance of professional herbal prescription, performed by a qualified therapist based on the patient's symptoms and requiring legal accreditation and technical-scientific competence.

Medicinal Plants for the Treatment of Anxiety

Herbal medicine has attracted significant research interest as an alternative and/or complementary approach in the treatment of anxiety, using medicinal plants with anxiolytic, calming and relaxing properties^{38,39}. Indeed, many patients show no response to conventional pharmacological treatments or cannot tolerate their adverse effects⁴⁰.

Regarding anxiolytic plants, the literature shows that herbal products such as *Valeriana officinalis*, *Passiflora incarnata*, *Melissa officinalis* and *Piper methysticum* are effective in reducing anxiety symptoms, acting on neurochemical mechanisms that modulate the central nervous system (CNS), such as increasing the availability of GABA (gamma-aminobutyric acid), a crucial neurotransmitter in anxiety regulation^{39,41}.

Piper methysticum (Kava-kava) has been officially recognised and frequently used in clinical studies, being attributed an anxiolytic effect; however, it presents some long-term safety restrictions^{40,42}. This plant's anxiolytic action is attributed to the pharmacological activity of alpha-pyrone, and it also exhibits anticonvulsant, sedative and anaesthetic properties. The dried stem or rhizome, when chewed, acts as a local anaesthetic and stimulates saliva production, and no adverse effects associated with its use have been identified to date⁴³⁻⁴⁵.

The study by Savage *et al.*⁴⁶ indicates an anxiolytic effect without dependence or hepatotoxicity; although not conclusive, the study highlights the therapeutic potential of Kava-kava. These findings are unsurprising, as Juvino *et al.*⁴⁷ note that it is one of the species with the highest number of studies involving patients with anxiety disorders, demonstrating its efficacy, which justifies its use as an effective and promising therapy for anxiety.

On the other hand, *Valeriana officinalis* has sedative, anxiolytic and antioxidant effects clinically demonstrated^{39,40,42,43}. Due to its sedative action, it aids sleep, and beyond its use

in the treatment of GAD, it acts on the CNS by increasing GABA concentration ^{44,45}.

Passiflora incarnata (passionflower) is used in controlled form for mild to moderate intermittent anxiety as a natural tranquilliser ⁴⁰⁻⁴². It has sedative, calming, antidepressant, anxiolytic, hypnotic and antispasmodic effects ⁴⁴.

Melissa officinalis (lemon balm) has a relaxing effect, reducing physical symptoms of tension and stress ^{39,40,48}. This effect is associated with its action on the GABA_A system, acetylcholinesterase inhibition (AChE) and metalloproteinase-2 inhibition, with rosmarinic acid being the main component responsible for its anxiolytic effect ⁴⁹.

In addition to the plants mentioned above, Lobo ¹ adds the following for anxiety treatment: *Hypericum perforatum* (St John's Wort); *Humulus lupulus* (hops); and *Rauvolfia serpentina* (Indian snakeroot or Devil Pepper). The literature also includes *Withania somnifera*, *Lavandula angustifolia* (lavender) and *Matricaria chamomilla* L. (chamomile).

Regarding *Withania somnifera*, Pratte *et al.* ⁵⁰ found that it contributes to a significant reduction in anxiety and has greater efficacy than psychotherapy. Indeed, *Withania somnifera* appears in the literature associated with anxiety treatment, reducing stress symptoms that give rise to anxiety ⁵¹. The systematic review carried out by Campos ⁵² similarly shows that this plant significantly reduces symptoms of anxiety and stress, improving QoL and well-being.

Conversely, the studies by Keefe *et al.* ⁵³ and Mao *et al.* ⁵⁴ highlight *Matricaria chamomilla* as a therapeutic alternative. In the former, chamomile showed a positive effect on the treatment of anxiety and GAD, with good levels of tolerance among participants. This study supports the use of chamomile in anxiety treatment, with efficacy comparable to anxiolytic medications in some cases. As noted by Aguiar *et al.* ⁴⁰, many patients do not tolerate or do not respond to side effects of conventional pharmacological treatments, making it important to explore alternative therapies. Mao *et al.* ⁵⁴ also found that participants treated with chamomile experienced fewer relapses, fewer symptoms and longer time to relapse, with good tolerability. These results show that long-term chamomile use may be safe and help maintain GAD, as also demonstrated by Rocha *et al.* ⁵⁵, who report that chamomile's anxiolytic effect derives from secondary metabolites of the flavonoid class.

Another plant that may be used in anxiety treatment is lavender. In the study by Kasper *et al.* ⁵⁶, Silexan, a standardised extract of *Lavandula angustifolia* used for therapeutic purposes, reduced symptoms of subclinical anxiety and GAD, showing efficacy comparable to medications such as lorazepam and paroxetine. Furthermore, Silexan improved sleep, somatic and depressive symptoms, and was well tolerated, representing an effective and safe alternative with a mild adverse-effect profile. Similarly, Moller *et al.* ⁵⁷ found that Silexan significantly reduced subclinical anxiety and improved sleep and QoL, establishing itself as an effective and safe alternative for treating subclinical anxiety symptoms. These findings show that lavender may be an effective therapeutic option, as also confirmed by Andrade *et al.* ⁵⁸ and Silva *et al.* ⁵⁹. In the first study, the authors note the efficacy of lavender in anxiety treatment due to its stress-reducing and anxiolytic effects. In the second study, focusing on lavender oil, various effects are described: the psychological effects of inhaling lavender oil occur through conscious perception, belief and expectation, and the pharmacological effects occur through modulation of cyclic adenosine monophosphate activity (reduction of cyclic adenosine monophosphate outcomes with sedation) and inhibition of glutamate binding (sedative effects). Thus, the use of the oil is considered safe, except for rare allergic reactions, and may be beneficial in patients with anxiety and reduce the need for antipsychotic medications.

Similarly, Donelli *et al.* ⁶⁰ also concluded that lavender is beneficial for anxiety treatment and, being administrable in multiple forms, inhalation was found to be the most effective route, followed by massage and capsules. These results converge with those reported by Kang *et al.* ⁶¹, in which lavender was shown to reduce symptoms of perceived anxiety, particularly when inhaled (aromatherapy).

5. Conclusion

This narrative literature review indicates that herbal medicine represents a complementary or alternative therapeutic strategy with significant potential for the management of anxiety, offering clinically relevant benefits and, in many cases, fewer adverse effects compared with conventional pharmacological treatments. Several medicinal plants (such as *Valeriana officinalis*, *Passiflora incarnata*, *Melissa officinalis*, *Matricaria chamomilla* L., *Withania somnifera* and *Lavandula angustifolia*) have demonstrated efficacy in reducing anxiety symptoms, acting through diverse neurochemical mechanisms within the central nervous system, particularly via modulation of GABAergic activity.

Despite these promising findings, the literature highlights the need for caution. Long-term safety profiles, potential herb–drug interactions and the lack of standardisation in formulations and dosages remain important limitations, underscoring the necessity for further robust and well-designed clinical studies. In this context, the role of qualified herbal therapists is essential to ensure responsible prescription practices, compliance with existing legislation and the provision of treatments that prioritise efficacy, safety and quality.

Therefore, herbal medicine constitutes a viable therapeutic option for the treatment of anxiety and holds considerable potential for integration into complementary and integrative healthcare models. However, achieving this integration requires continued scientific research, strengthened regulatory frameworks, appropriate professional training and greater public education regarding the safe and informed use of medicinal plants.

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