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A Rajendran
Lifecarephytolabs, Perambalur,
Tamil Nadu, India

R Sudeshraj
Lifecare Phytoremedies,
Ayyappanthangal, Chennai,
Tamil Nadu, India

S Sureshkumar
Lifecare Phytoremedies,
Ayyappanthangal, Chennai,
Tamil Nadu, India

Phytonutrients: Stress and relaxation dietary health food supplements

A Rajendran, R Sudeshraj and S Sureshkumar

Abstract

Stress is the psycho physiological sign which is really very complicate to describe. The following medicinal plants such as Caryophyllus Aromaticus, Valerian, Camellia sinensis, Rauvolfia Serpentine, *Cinnamomum verum*, Brahmi, are claimed as anti-stress, anti-aging, disease prevention and life strengthening activities found in scientific research articles. Along with these herbs Gamma-Aminobutyric Acid also used in health supplement as neuro transmitter. The objective here is to provide a compiled report of these medicinal herbs on stress and relaxation effects and its ethnopharmacological considerations. In the present article, a detailed description of anti-stress and relaxation effects has been presented. All the findings were correlated with the pharmacokinetic activities to assess the above mentioned herbs.

Keywords: medicinal plants, phytonutrients, pharmacological activities, stress and relaxation

Introduction

Since 3000 years from now, medicinal plants have been proven to treat various complicated ailments effectively without giving any side effects. Anxiety and depression are the two major mental illnesses. Worldwide more than 55 million people are suffering from mental disorders^[1]. The complexities of the central nervous system make diagnoses, treatment, and amelioration of these debilitating illnesses exceptionally difficult. Advancement in these areas would be invaluable contributions in the effort to reduce the global impact of anxiety-based conditions. The universality of herbal remedies in many cultures makes them an appropriate treatment to explore.

A number of reviews of the clinical effectiveness of herbal and nutrient treatments for depression, anxiety disorders, and sleep disturbance have been published over the past decade. These have reviewed data associated with a number of treatments, including St. John's Wort, S-adenosyl-methionine (SAM-e), B vitamins, inositol, choline, kava, omega-3 fatty acids/fish extracts, valerian, lavender, melatonin, passionflower, skullcap, hops, lemon balm, black cohosh, ginkgo biloba, extracts of Magnolia and Phellodendron bark, gamma-aminobutyric acid (GABA), theanine, tryptophan and 5-hydroxytryptophan (5-HTP). However, none of these studies has been conducted in a systematic way.

Anxiety is serious psychological disorder that has to be cured using suitable medication without any side effects. Herbal based nutraceutical supplements have been used for centuries to alleviate anxiety and its associated symptoms without any side effects.

[The objective of this paper is to systematically review and summarize the available literature on herbal remedies and dietary supplements for treating anxiety and related symptoms in order to aid mental health practitioners in advising their patients and provide insight for future research in this field^[2-8].

Medicinal herbs with anti stress effects

Caryophyllus aromaticus

[Studies suggest that methanolic extract of flower buds of *Syzygium aromaticum* could be used as stress related ailments and hyperglycemic condition.] It is further reported that the extracts showed antioxidant potential, total antioxidant, and total reducing power capacity attributed due to the presence of phenolic compounds in it. However, further extensive research should be conducted to substantiate *Caryophyllus Aromaticus* based supplement for stress relative ailments.

Correspondence
A Rajendran
Lifecarephytolabs, Perambalur,
Tamil Nadu, India

Valeriana officinalis

[Valerian (*Valeriana officinalis*) belonging to valerianaceae family is a well known herb and medicinal plant that has been widely used all over the world especially in Europe, China and Middle East. It is widely used as a sleep aid and sedative in many parts of the world but is also known to relax smooth muscle, hence used for treating stomach and intestine cramps. Alkaloids, terpenes, organic acids and its derivatives, valepotriates and flavones are the known pharmacologically active compounds found in valerian extract. In general, it is accepted that the valepotriates are the compounds responsible for the sedative activity of the Valerianaceae. Extracts of the roots of valerian (*Valeriana officinalis*) are widely used for inducing sleep and improving sleep quality. A systematic review of randomized, placebo-controlled trials of valerian for improving sleep quality is presented.

The root and rhizome of the valerian plant (*Valeriana officinalis* L.) is used medicinally for its sedative properties with indications including nervous tension, insomnia, anxiety and stress [9]. One study found that valerian could sedate the agitated person and stimulate the fatigued person, bringing about a balancing effect on the system [10, 11].

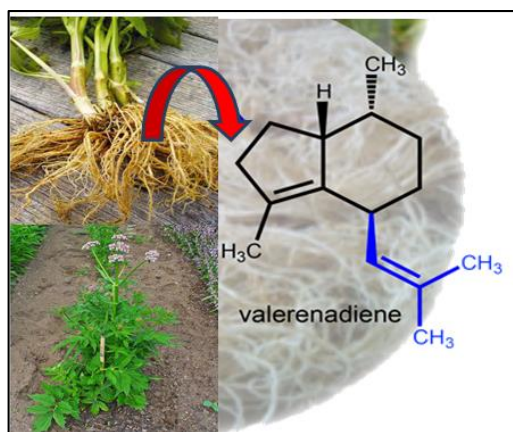


Fig 1: *Valeriana officinalis*

Camellia sinensis

Green tea has been used worldwide for more than ten decades as it has amino acid and theanine were the main components which possess relaxant properties [12].

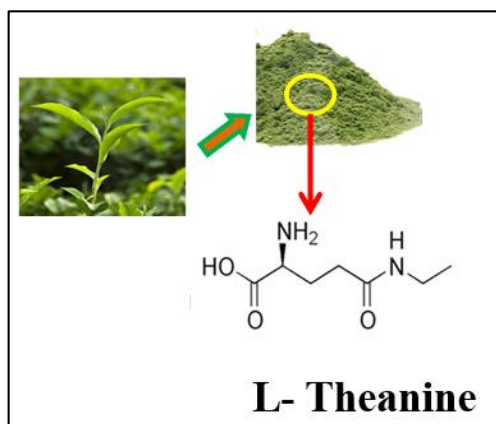


Fig 2: Green tea based supplement powder from its leaf, L-Theanine bioavailable form is highlighted

1-2% of L-Theanine is found in green tea of its total leaf weight. In a dose dependant manner, theanine could cross blood brain barrier. L-Theanine activates the alpha waves in the brain which main indication of awake, alert and without drowsiness. L-theanine would help to regulate stressful behaviour like blood pressure, heart rate and cortisol secretion. Study suggested that green tea based supplement could attenuate signs of stress and its related behaviour [13].

GABA (g-aminobutyric acid)

GABA generally known as an inhibitory neurotransmitter of central nervous system (CNS). This GABA mitigate the nerve impulse transmission between neurons by hyperpolarization of postsynaptic membranes. Further the mitigation of neurotransmitter release into the synapse through presynaptic G-protein attached receptor inhibition of voltage-gated Ca^{++} contrivances. GABA binds at two separate receptors to mediate the earlier said two inhibiting special effects. GABA-mediated fast synaptic inhibition due to the hyperpolarization of the postsynaptic membrane is the result of binding to the GABA receptor which is a postsynaptic ligand-gated Cl^- and CO_3^{2-} ion network. GABA-mediated reticence of neurotransmitter discharge is a result from binding to presynaptic GABAB G-protein united receptor [14]. The use of GABA could be beneficial for human brain. Thus, the role GABA plays vital role in inhibiting the excitation in brain and by this means control anxiety & stress.

Rauwolfia serpentine

Rauwolfia serpentina (RS) also called as Indian snakeroot belongs to the family of Apocynacea. Rauwolfia, reserpine and alseroxyton are the three major alkaloids found in RS plant which is believed to control overt anxiety in ambulatory patients. Study reported that the drug made up of RS appears to be effective in treatment of hypertension. RS also control the anxiety in psychiatric patients. It is proven clinically that the RS based drug is as effective as like conventional drug for the treatment of hypertension, anxiety and other mental illness related ailments [15].

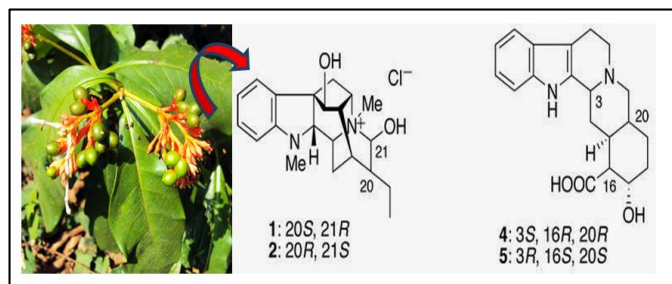


Fig 3: *Rauwolfia serpentina*

Cinnamomum verum

Cinnamomum verum belonging to lauracea family originated from Sri Lanka and found in southern region of India. The plant has several medicinal values such as anti-oxidant, anti-diabetic, analgesic, anti-microbial and cardiovascular disease protective effects. In addition, the active compound present in cinnamon also possess promising effects against neurological disorder, Parkinson disease, and Alzhiemer's disease [16, 17].

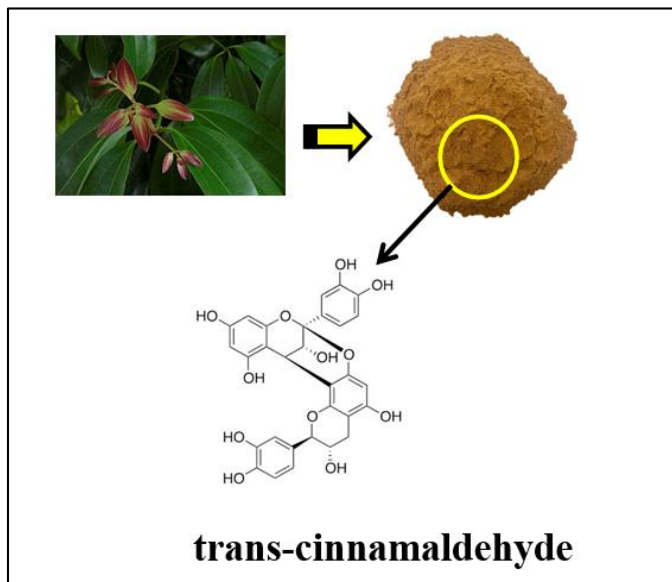


Fig 4: Bio available trans-cinnamaldehyde from *Cinnamomum verum*

Reyhaneh *et al.* evaluated the putative antidepressant and anti-anxiety effects using cinnamon essential oil. They concluded that Cinnamon essential oil effectively improved the symptoms depressive and anxiety disorders. Further the authors reported that dose-response effects need to be evaluated. It was reported that trans-cinnamaldehyde might be responsible for anxiety disorder [18].

Bacopa monnieri

Bacopa monnieri has been known for centuries in ayurvedic medicine to treat various ailments including memory enhancer, sedative, and anti – epileptic [19].

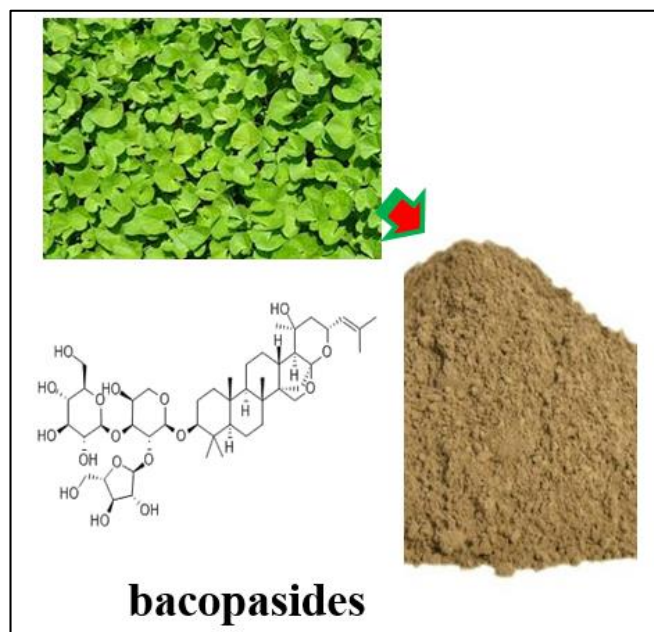


Fig 5: *Bacopa monnieri*

Carlo *et al.* studied the effect of *Bacopa monnieri* extract on cognitive function, anxiety, and depression in healthy old age participants. The authors concluded that the extract obtained from bacopa improved the cognitive function [20, 21].

Memory-enhancing effects of extracts obtained from bacopa might be attributed to the bio available saponins such as

bacosides, bacopasides in it.

Conclusion

Traditional plant derived medicines possess promising therapeutic values and hold an imperative place in the medicine history. From the literature it is understood that the following plants *Caryophyllus Aromaticus*, *Valerian*, *Camellia sinensis*, *Gamma-Aminobutyric Acid*, *Rauwolfia Serpentine*, *Cinnamomum verum*, *Brahmi* have been used as an effective remedy for stress and associated ailments. Currently the pharma industries having been developing medicines for stress and related ailments as majority of those medicines contain phytochemicals derived from plants source. Identification and standardization of active principle from medicinal plant is pivotal to being able to develop an effective supplement for various ailments. Understanding the quantitative as well as qualitative techniques to extracts active phytochemicals using various novel approaches are further required. In addition, optimization of dosage level and interactions with prescription medications need to be evaluated. Optimization and standardization of plant derived medicines further would minimize the side effects and helps to develop an inevitable body of indication for their efficacy.

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