

A Review paper Herbal Infusions for Stress Relief: A Review on Guava Leaf and Hibiscus Flower

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Abstract

Stress is an increasing world health issue, which has negative physical and psychological impacts, leading to disorders like anxiety, depression and heart diseases. The recent years have seen the growing popularity of herbal remedies as safe and effective alternatives in the management of stress. The present review is devoted to herbal tea made of guava leaf (*Psidium guajava*) and hibiscus flower (*Hibiscus sabdariffa* / *Hibiscus rosa-sinensis*), using the effects in stress relief and the overall health promotion as the criteria. The research is founded on secondary data gathered through peer reviewed journals and scientific databases. Guava leaf and hibiscus are both abundant in bioactive phytochemicals, such as flavonoids, polyphenols, and anthocyanins, with high antioxidant, anti-inflammatory and neuroprotective activities. These substances serve to reduce oxidative stress, control the activity of neurotransmitters, and alter the hypothalamic-pituitary-adrenal (HPA) axis, which lowers the level of stress and enhances mental health. Comparative analysis reveals that hibiscus infusions have a greater antioxidant capacity whereas guava leaf infusions have greater pharmacological activity, anxiolytic and neuroprotective. Both infusions tend to be safe when taken in moderate doses, but little standardization of dosage has been made. In conclusion, the hibiscus and guava leaf herbal infusions show potential as effective natural methods of dealing with stress. Nevertheless, additional clinical studies need to substantiate their effectiveness, guarantee their safety, and standardized therapeutic guidelines to employ them in the contemporary healthcare systems.

Keywords: Herbal Infusions, Stress Relief, *Psidium guajava*, *Hibiscus sabdariffa*, *Hibiscus rosa-sinensis*, Phytochemicals

Introduction

Stress has become one of the health issues of great concern in the world, both physically and psychologically. The rapid urbanization, high and demanding lifestyles, as well as the growing psychosocial demands have led to the escalation of stress-related disorders including anxiety, depression, hypertension and sleep disturbances. Chronic stress is especially very detrimental in that, it interferes with neuroendocrine balance, raises cortisol levels and oxidative stress thus leading to the formation of a variety of non-communicable diseases. Over the past few years, there has been an increasing interest in alternative and complementary therapies, particularly plant-based remedies, to treat stress because of how safe they are perceived to be, how cheap they are, and how few side effects they have in comparison to conventional pharmacological treatment (Magomedova & Fatima, 2025).

One of the most readily available forms of

phytotherapy is herbal infusions, which are usually taken in the form of teas or decoctions. Such preparations entail extraction of bioactive compounds in plant materials with the use of hot water thus making them easy to prepare and universally acceptable across cultures. Herbal infusions are considered to have a high therapeutic potential due to the presence of phytochemicals like flavonoids, polyphenols, alkaloids, and terpenoids, which have antioxidant, anti-inflammatory, and neuroprotective effects. They are important compounds in the regulation of stress responses, minimizing oxidative damage, and affecting neurotransmitter activity within the central nervous system.

Psidium guajava (guava) leaves are among other medicinal plants that have been of great interest due to their varied pharmacological effects. Guava leaves contain high amounts of secondary metabolites, such as phenolic compounds, flavonoids and terpenes, which make them antioxidant and anti-inflammatory.

These bioactive components are found to be related to relaxation and antistress effects and have justified their traditional application in anxiety and other related disorders. Experimental research also shows that guava leaf extracts possess the effect of anxiolytic and antidepressant-like effects in animal models, indicating that they might be useful in reduce stress and mental health (Biswas et al., 2021).

Likewise, another commonly used medicinal plant is the Hibiscus sabdariffa (hibiscus) which has calming and health benefits. The infusions of hibiscus are famous drinks in a lot of regions of the world and are known to contain a large number of polyphenols and anthocyanins. The compounds are excellent antioxidants, and they can be used to alleviate oxidative stress, a major contributor to the pathophysiology of stress-related disorders. Neuroprotective effects Researches have shown that hibiscus extracts have the potential to reduce anxiety-like behaviors as well as neurochemical changes caused by stress, indicating their neuroprotective effects. Moreover, there is clinical and experimental evidence that one of the benefits of regular hibiscus intake is the ability to optimize cardiovascular parameters and physiological tolerance to stress (Montalvo-González et al., 2022). The growing need in natural remedies has brought about a resurgence of scientific research on the effectiveness of herbal infusions like guava leaf and hibiscus flower in the management of stress. Even though they have been extensively used traditionally, there is still a necessity of thorough reviews that will bring together the existing information on their phytochemical composition, their mechanism of action, and their therapeutic potential. This review, therefore, seeks to discuss the use of guava leaf and hibiscus flower infusion in relieving stress with reference to their bioactive compounds, pharmacological effects, and scientific evidence.

Research objectives

- To review and compare the therapeutic properties of guava leaf (*Psidium guajava*) and hibiscus (*Hibiscus sabdariffa* / *Hibiscus rosasinensis*) infusions.
- To analyze the mechanisms of stress relief associated with guava leaf and hibiscus infusions.
- To evaluate the safety, dosage, and potential

side effects related to the consumption of these herbal infusions.

Research methodology

A secondary research approach using a thorough examination of the available literature will be used in the current research. Journals, books, and reliable online databases (PubMed, Google Scholar, ScienceDirect, and SpringerLink) were searched to find relevant data. The keywords such as guava leaf, hibiscus flower, herbal infusions, stress relief were used to select relevant works. The gathered literature was critically assessed, compared and synthesized to determine the phytochemical properties, mechanisms of action and therapeutic effects. Relevant and recent studies were used to guarantee reliability and validity of findings.

Overview of Herbal Infusions

Herbal infusions, also called herbal teas or tisanes, are aqueous solutions that are acquired through the steepage of plant materials like leaves, flowers, roots, seeds or bark in hot water. In contrast to the traditional tea that is made of *Camellia sinensis*, herbal infusions are made out of many different medicinal plants and are generally caffeine-free. Its preparation technique typically includes adding boiling water to vegetable materials and steeping them to release bioactive compounds during a certain period, typically 5 to 15 minutes. Herbal infusions are centuries old and have been the traditional medicine system throughout the world due to their simplicity, accessibility and cultural acceptance.

Over the past few years, herbal infusion has become scientifically accepted as functional beverages because it is a rich phytochemical beverage. These infusions are rich in various bioactive compounds such as flavonoids, phenolic acids, alkaloids, terpenoids, and carotenoids; these are the same compounds that make them useful in therapy. Research has indicated that they have a powerful antioxidant activity that neutralizes the free radicals and decreases oxidative stress which is a major contributor to the occurrence of chronic diseases. Moreover, the herbal infusions can also have anti-inflammatory, antimicrobial, antiviral, and neuroprotective properties, which can further increase their usefulness in improving overall health and well-being (Naseer et al., 2018).

A variety of factors affect the biological activity of herbal infusion such as plant type, method of preparation and extraction conditions. Infusions commonly exhibit greater antioxidant potential than other forms of preparation (decoctions, etc.) because they are less destructive of heat-sensitive phytochemicals. Moreover, these preparations are aqueous, increasing bioavailability and absorption of active compounds in the human body, and thus, an effective delivery of phytochemicals (**Renukadevi et al., 2025**).

Health wise, herbal infusions are now seen as complementary methods of disease prevention and stress management. Their antioxidant and neuroprotective effects are important in regulating physiological response to stress by suppressing oxidative stress and promoting cellular activities. Additionally, frequent use of herbal infusions has been linked to better metabolic health, immunity, and decreased non-communicable disease risk (**Ramola et al., 2023**).

Although scientifically justified, there is still a developing body of scientific validation of many herbal infusions, and some preparations have a paucity of clinical evidence. As a result, additional studies are needed to standardize dosage, test long-term safety, and determine their effectiveness based on controlled clinical trials. However, herbal infusions are an emerging, natural and holistic method of improving health and reducing stress in contemporary lives.

Guava Leaf (*Psidium guajava*)

Guava, also known as *psidium guajava* is a medicinal plant that is widely spread in the tropical and subtropical zones and it is a member of the Myrtaceae family. Although the fruit is commonly known to contain nutritional value, the use of the guava leaves in traditional medicine systems has been widely used due to its medicinal values. It has historical and ethnomedicinal evidence indicating that guava leaves were used in the treatment of gastrointestinal disorders, inflammation, infections, and metabolic disorders, which indicates their wide pharmacological possibilities.

The pharmacological importance of the guava leaves is mainly as a result of their high phytochemical content. They are rich sources of bioactive compounds, which include flavonoids (including quercetin), polyphenol,

tannins, triterpenoids, carotenoids, and essential oils. The compounds have been reported to have strong antioxidant and anti-inflammatory effects, which are very important in the prevention of oxidative damage of cells and physiological balances. One of the primary flavonoids in guava leaves, quercetin, has been found to be a primary active ingredient behind much of its biological properties, such as spasmolytic and neuroprotective effects (**Kumar et al., 2021**).

Guava leaves have potential anxiolytic and relaxation potentials in the stress management context. Their calming effects are a contribution to the presence of terpenes and other phytochemicals that regulate the activities of neurotransmitters and lower the levels of oxidative stress in the nervous system. One of the factors that contribute to development of anxiety and other stress related disorders is oxidative stress, and guava leaves have antioxidant property that counteracts these effects. The experimental research also found out that guava leaf extracts contain antidepressant-like and neuroprotective properties, which further justify its use in the improvement of mental health.

Moreover, guava leaves are said to possess antimicrobial, antidiabetic, anti-inflammatory, and cardioprotective effects, which qualify them to be a versatile herbal medicine. Their capability to control metabolic activities and minimize inflammation has an indirect role in reducing stress through the enhancement of the wellbeing of the physiological wellbeing. The leaves are usually used as herbal infusions or decoctions, making it possible to extract efficiently water-soluble phytochemicals, thus increasing their bioavailability and therapeutic effect (**Deguchi & Miyazaki, 2010**).

Although their traditional use has been vast and continues to receive scientific validation, additional clinical research is needed to determine standard dosages and to determine their long term safety and efficacy. However, guava leaf infusions may be a promising natural intervention in the context of stress-reduction and health promotion in general; they would combine traditional knowledge with contemporary scientific studies.

Hibiscus Flower (*Hibiscus rosa-sinensis* / *Hibiscus sabdariffa*)

Hibiscus is a well-known medicinal plant of family Malvaceae, the most commonly used species of

Hibiscus in traditional and modern herbal medicine are *Hibiscus sabdariffa* (roselle), and *Hibiscus rosa-sinensis*. The flowers and calyces of hibiscus have wide application in the making of herbal infusions, beverages and therapeutic formulations. Historically, hibiscus has been utilized in all cultures due to its cooling, calming, and restorative effects, especially in the treatment of cardiovascular disorders, inflammation and stress related illnesses. Its efficacy as a functional drink has also become popular because of its palatable flavor, attractive color, and impressive health advantages.

Hibiscus has a high phytochemical composition that makes its therapeutic potential. Hibiscus flowers are also rich in anthocyanins, flavonoids, phenolic acids and organic acids like hibiscus acid. Anthocyanins are the most important of these, and are the प्रमुख compounds of the antioxidant action of the plant. These bioactive components assist in countering the effects of free radicals, hence alleviating the effects of oxidative stress, which is one of the significant sources of stress-related conditions and chronic illnesses. Besides the antioxidant properties, hibiscus also contains anti-inflammatory, antihypertensive, and lipid-lowering properties, and is, therefore, helpful in overall physiological health (Guardiola & Mach, 2014).

Hibiscus has promising neuroprotective and sedative effects in stress management. Oxidative stress and inflammation are key factors in the pathophysiology of anxiety and depression, and hibiscus can alleviate the processes by its antioxidant effects. It has been demonstrated that, with routine consumption, hibiscus infusions are able to decrease oxidative stress indicators and positively affect physiological resilience, thus indirectly aiding mental health. Moreover, the possibility of controlling blood pressure and enhancing the health of the heart is also a measure of stress alleviation, since cardiovascular load is commonly linked to chronic stress disorders of the body.

Hibiscus infusions are usually made using a mixture of dried calyces or flowers with hot water to provide an effective extraction of water-soluble phytochemicals. This technique increases bioavailability of active compounds and enables it to be a convenient and accepted route of consumption. The infusion is caffeine-free, so it is an appropriate substitute to the traditional tea and coffee, that is, those who want to

have relaxation without intense stimulant effects (Soto et al., 2016).

Although the application and growing scientific support of hibiscus have been vastly used traditionally, there is need to conduct more research to create standardized dosages, long term safety and clinical efficacy of hibiscus in stress management. The therapeutic effects of it can be affected by variability in the methods of preparation, plant species, and phytochemical content. However, the existing data indicates that hibiscus flower infusions have a promising future as a natural remedy with high antioxidant, neuroprotective, and stress-reducing capabilities, which can be beneficial in the context of holistic health and well-being.

Comparison of Guava Leaf and Hibiscus Infusions

The *Psidium guajava* (guava leaf) and *Hibiscus sabdariffa* / *Hibiscus rosa-sinensis* (hibiscus flower) herbal infusions have been attracting significant attention due to their possible stress management effects and general health promotion. Despite the fact that both of these plants are abundant in bioactive compounds and have strong pharmacological effects, they are different in their phytochemical composition, mechanisms of action and therapeutic effects. Comparative analysis of the two herbal infusions gives more insight into the benefits of the two as well as a synergistic effect.

Phytochemically, guava leaves are typified by flavonoids (particularly quercetin), tannins, phenolics, alkaloids, and triterpenoids. The compounds add to potent antioxidant, anti-inflammatory, and antimicrobial effects. Research shows that guava leaves also include various bioactive compositions that can stabilize physiology and prevent the effects of oxidative stresses and related damages. Conversely, hibiscus flowers contain anthocyanins, flavonoids, and organic acids especially, and this is what makes them so colorful and strong antioxidants. Hibiscus anthocyanins are also important in the scavenging of free radicals, as well as alleviating oxidative stress, and thus can be very useful in controlling cellular destruction caused by stress factors (Chandrasekara & Shahidi, 2018).

Both the guava leaf and hibiscus infusions have been described to have a high free radical scavenging properties in terms of antioxidant capacity but hibiscus

is reported to have a high antioxidant capacity because of its high content of anthocyanin. On the other hand, guava leaves have a wider range of phytochemicals, with several biological activities in addition to antioxidant activity. This implies that, although hibiscus can be more effective in decreasing oxidative stress, guava leaves can be more therapeutic in a holistic manner **(Wang et al., 2014)**.

Guava leaf infusions are specifically observed to have anxiolytic and neuroprotective effects when compared to other substances in terms of their effects on stress and mental health. Quercetin and related compounds are also present and they assist in the regulation of neurotransmitter activity, which assists in the relaxation and alleviation of anxiety symptoms. Moreover, indirect effects of guava leaves are in the support of stress management through enhancement of metabolic and immune processes. Conversely, the antioxidant and cardiovascular effect of hibiscus infusions as the main stress reliever has been reported. Hibiscus helps the body to better handle stress and improves health by lowering blood pressure, improving lipid profiles, and reducing oxidative stress, all of which enhance the body's resilience to stress and health in general **(Studzińska-Sroka et al., 2021)**.

The other significant difference is their physiological targets. Guava leaf infusions are more likely to have a direct effect on the nervous system with their effect on neurotransmission and the mild sedative effects. Hibiscus on the other hand, is mainly aimed at systemic physiological functions, including cardiovascular health and inflammation, which indirectly lead to the alleviation of stress. The difference brings out the complementary quality of the two herbal infusions **(Nowak et al., 2025)**.

Both guava leaf hibiscus infusion are usually deemed safe when taken in moderate doses in terms of safety and consumption. They are usually made as aqueous infusion, where they can easily extract water-soluble phytochemicals. Nonetheless, differences in the preparation protocol, dose, and personal reaction can have an impact on their efficacy and safety profiles.

Mechanisms of Stress Relief

The action of herbal infusions on the stress-relieving effect occurs via a series of interconnected biological processes, with the primary ones being antioxidant effect, neurotransmitter modulation, and

neuroendocrine regulation. All these mechanisms contribute to the preservation of a balanced state of the body and lessen the detrimental impact of chronic stress on the mind and body.

The antioxidant effect of phytochemicals in the herbal infusions is one of the main mechanisms. Stress is directly linked to the augmentation of reactive oxygen species (ROS) formation, which causes cells to suffer oxidative harm in terms of lipid, protein, and DNA damage. Herbal infusions which contain a lot of polyphenols and flavonoids are natural antioxidants that counter these free radicals and boost the endogenous antioxidant defense system of the body. These compounds limit oxidative stress, which helps protect the neuronal cells and inhibits cell dysfunction, caused by stress, and thus leads to better mental health **(Lee et al., 2017)**.

The other vital process is the neurotransmitter modulation within the central nervous system. The disproportion of neurotransmitters like serotonin, dopamine, gamma-aminobutyric acid (GABA), and norepinephrine are commonly associated with stresses and anxiety. Herbal compounds have been demonstrated to affect the production, release and uptake of these neurotransmitters, which restores neurochemical balance. As an example, the GABAergic activity can be enhanced to achieve calming and anxiolytic effects, whereas controlling the level of serotonin can lead to better mood and emotional stability. This modulation is important in alleviating anxiety, depression, and mental fatigue symptoms.

Another relevant pathway by which herbal infusions relieve stress is the regulation of the hypothalamic-pituitary-adrenal (HPA) axis. Hormonal reactions to stress in the body, especially cortisol release are regulated by the HPA axis. Long-term overstimulation of this system provides an increase in the level of cortisol, which may weaken mental activity and predispose to mood disorders. Herbal adaptogens and bioactive compounds assist in balancing the activity of the HPA axis and decreasing cortisol release and making the body more resilient to stressors **(Lopresti et al., 2022)**.

Moreover, herbal infusions have anti-inflammatory and neuroprotective properties, which also help to reduce stress. The low-grade inflammation of the brain is commonly linked to chronic stress, causing brain

damage and deterioration of neurotransmission. Phytochemicals like flavonoid and phenolic acids contribute to the inhibition of the inflammatory pathways and ensure that the neural tissues are not damaged (Shal et al., 2018).

Finally, the antioxidant defense, neurotransmitter regulation, hormonal stability and neuroprotection are multifactorial and contribute to the stress-relieving properties of herbal infusions. All these efforts make herbal infusions a powerful and natural intervention to deal with stress and achieve mental health.

Safety, Dosage, and Side Effects

Herbal infusions made of guava leaf (*Psidium guajava*) and hibiscus flower (*Hibiscus sabdariffa* / *Hibiscus rosa-sinensis*) are usually regarded as safe when used in moderate amounts. Nevertheless, their safety, the correct dosage and side effects have to be taken into consideration to make sure that they can be used effectively and without any risk especially when they are used therapeutically.

Regarding safety, research has shown that guava leaf extracts have high degree of safety. Even high doses (up to 5000 mg/kg in animal models) have been shown to be non-toxic in toxicological studies and moderate doses over a long period are usually not toxic. Also, there is clinical and experimental evidence indicating that guava leaf tea has no genotoxic effects and may be used regularly, within recommended amounts, without any harm. Likewise, hibiscus underwent extensive clinical trials and is, in general, considered safe, with no major adverse effects being observed in most clinical trials on humans (Manekeng et al., 2019).

Concerning dosage, no generally accepted rule exists when it comes to either guava leaf or hibiscus infusions. Nevertheless, clinical and traditional use indicates that moderate use is good. Guava leaf infusion is usually made by taking a small amount of dried or fresh leaves soaked in hot water and taken 1 - 2 times per day. In the case of hibiscus, it has been shown that moderate intake of herbal tea (i.e., 2-3 cups per day) is safe in the short-term and can be used therapeutically. However, the dosage can be varied based on the age, health conditions, and the route of administration, which underscores the importance of standardized clinical recommendations (Butt et al., 2025).

Although they are generally safe, there have been some

mild side effects. Sometimes the guava leaf extract could lead to gastrointestinal upsets like nausea or stomach aches in people who are sensitive. With hibiscus, side effects are rare; however, they can be mild digestive disturbances, allergic reactions, and possible interactions with drugs, especially antihypertensive ones. Overuse or over a long period of time either infusion can have adverse effects with potential liver toxicity in high-dose guava extracts.

Conclusion

Guava leaf (*Psidium guajava*) and hibiscus flower (*Hibiscus sabdariffa* / *Hibiscus rosa-sinensis*) herbal infusions have a high potential as a natural stress reliever and health promoter. The results of this review indicate that both plants contain bioactive phytochemicals like flavonoids, polyphenols, and anthocyanins that make them very effective antioxidants, anti-inflammatory agents, and neuroprotective. These substances are significant in oxidative stress alleviation, neurotransmitter balance and neuroendocrine balance, which relieves stress and enhances mental health. A comparative study shows that although hibiscus infusions have a relatively higher antioxidant activity owing to the presence of anthocyanin, guava leaf infusions have a wider range of pharmacological properties, such as direct anxiolytic and neuroprotective effects. This shows that the two herbal infusions are effective but in complementary ways. The combination or alternative use of the two can thus be beneficial in therapeutic effects in stress management. Moreover, the review points out that the guava leaf infusion, as well as the hibiscus infusion, are usually safe to be consumed in moderate doses, and only a few side effects are reported. But the lack of standardized dose regimens and long-term clinical evidence is still a concern. Their effectiveness and safety may also be affected by differences in the way they are prepared, the composition of the plant, and the reaction of different individuals.

In conclusion, guava leaf and hibiscus flower infusions are potentially useful, inexpensive, and culturally acceptable strategies in addressing stress in the contemporary lifestyle. Although they have been encouraging in experimental and clinical studies, more well-designed human studies are needed to confirm their effectiveness, to determine their standard dosages, and to determine their long-term safety. Research into

these herbal remedies can be further improved by combining traditional knowledge with scientific research to promote the use of these herbs as part of a holistic approach to health care and stress management.

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