

Synergizing Tradition and Science: A Comprehensive Review of a Chinese Herbal Tea Blend for Enhanced Respiratory and General Health

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Abstract: This comprehensive analysis delves into the multifaceted health benefits of a unique herbal tea blend comprising pear, *Borassus flabellifer* fruit (Hai Di Ye), *Imperata cylindrica* (Mao Gen), sugarcane, and fig. Each component contributes to the tea's overall efficacy by promoting respiratory health, offering anti-inflammatory and antibacterial properties, and providing potential anticancer, hepatoprotective, and antidiabetic benefits. Pears enrich the blend with antioxidants and immune-boosting capabilities, crucial for respiratory system defense and alleviating hypersensitivity reactions linked to air pollution. *Borassus flabellifer* and sugarcane add to the tea's soothing effects on the throat, with their antioxidant properties further regulating inflammatory responses within the respiratory tract. The inclusion of *Imperata cylindrica* and figs introduces a spectrum of phytochemicals, known for their significant roles in reducing inflammation, battling cancer cell proliferation, protecting liver function, and aiding in blood sugar regulation. This tea blend, rooted in traditional Chinese medicine, embodies a holistic approach to health maintenance, merging the pleasure of consumption with substantial therapeutic advantages.

Keywords: traditional Chinese medicine, herbal tea, pear, *Borassus flabellifer* fruit, *Imperata cylindrica*, sugarcane, fig

1. Introduction

The practice of Traditional Chinese Medicine (TCM) is a millennia-old healing system that has been integral to health care in China and across various parts of Asia. Rooted in ancient philosophies such as Daoism, TCM encompasses a broad range of practices, including herbal medicine, acupuncture, dietary therapy, and Tai Chi. Among these, Chinese herbal medicine stands out for its unique approach to diagnosis and treatment, emphasizing the balance of the body's Qi (vital energy), Yin and Yang, and the harmony between the human body and its environment.

Herbal teas, concocted from a rich pharmacopeia of herbs, plants, and fruits, occupy a revered place within TCM. These teas are not only cherished for their aromatic flavors but also for their therapeutic benefits, addressing a plethora of ailments from the mundane to the chronic ^[1]. The popularity of these herbal teas in China transcends mere tradition. It is a testament to their enduring relevance in promoting health and wellness in contemporary society.

Among the myriad of herbal teas, a particular blend containing pear, *Borassus flabellifer* fruits, *Imperata cylindrica*, Sugarcane, and figs has garnered attention not only for its pleasant taste but also for its purported health benefits. Frequently used in traditional Chinese medicine for the treatment of respiratory system inflammation, common colds, and cough symptoms, this tea exemplifies the TCM principle of using natural substances to maintain balance and health within the body.

Pear and figs, with their sweet and nourishing properties, are believed to protect the lungs and soothe the throat. *Borassus flabellifer* fruit, a prized ingredient in many Asian cultures, is renowned for its effectiveness in relieving coughs and enhancing respiratory health. *Imperata cylindrica* and Sugarcane, both known for their cooling and detoxifying qualities, are thought to aid in reducing fever and inflammation ^[2].

The current fascination with this herbal tea blend, both within and beyond China's borders, is reflective of a broader global trend towards holistic and preventive health care approaches. As people

increasingly seek out natural remedies for health maintenance and disease prevention, the wisdom of ancient practices such as TCM offers valuable insights and alternatives to conventional medicine.

In this review, we critically analyze each ingredient's contribution to respiratory health and other biological activity effect, shedding light on the blend's potential roles in providing respiratory support and overall health benefits.

2. Nutrient composition of different components

2.1 Pear

Pears are widely consumed in global cuisines due to their delectable taste and succulent texture. In traditional Chinese medicine, pears have been utilized for lung nourishment, phlegm dissolution, fluid circulation promotion, cough alleviation, and skin health enhancement [2]. From a nutritional perspective, pears are abundant in dietary fiber, vitamin C, as well as various antioxidants like flavonoids and phenolic compounds [3; 4].

Phenolic compounds and flavonoids possess a molecular structure that includes multiple aromatic rings and one or more hydroxyl groups (-OH). These structures enable flavonoids to donate hydrogen atoms or electrons to free radicals, effectively neutralizing them and preventing oxidative damage to cells and biomolecules such as DNA, proteins, and lipids.

Scientifically substantiated by numerous studies, the health benefits of pears include improved digestive system health and reduced risk of cardiovascular diseases attributed to their high fiber content [5; 6]. The presence of antioxidants in pears has demonstrated efficacy against oxidative stress, inflammation reduction, and disease prevention [7; 8]. Research indicates that regular pear consumption is associated with lower risks of chronic conditions such as rhinitis and type 2 diabetes [9; 10]. A clinical trial exhibited that pear extract can stimulate the growth of immune-defending microbiota while significantly inhibiting pro-inflammatory cytokines (including IgE, IL-4, IL-5, and IL-1) in asthmatic mice exposed to air pollution [11]. The discovery demonstrates that pears have the potential to alleviate respiratory hypersensitivity reactions associated with air pollution.

2.2 *Borassus flabellifer* fruit (Hai Di Ye)

The dried product of the fruits of *Borassus flabellifer*, known as Hai Di Ye in traditional medicine, is renowned for its antitussive and pulmonary protective properties. *Borassus flabellifer* fruits contain various components including proteins, polysaccharides, fats, and organic acids. The amino acid composition in *Borassus flabellifer* fruits is relatively abundant with identification of up to 18 different types. Notably, glutamic acid, arginine, and aspartic acid are present in significant quantities. It is worth noting that *Borassus flabellifer* fruits contain seven of the eight essential amino acids required by the human body, lacking only methionine [12].

Recent studies have emphasized its antioxidant properties. Researchers have isolated novel structured antioxidant polysaccharides from it which exhibit dose-dependent free radical scavenging activity [13]. Oxidative stress is closely associated with a multitude of chronic ailments such as aging, cardiovascular diseases, diabetes, and cancer. By delving into its antioxidative potential, scientists have unveiled its capacity to effectively regulate lipid metabolism disorders and reduce blood glucose levels in individuals afflicted with diabetes [14; 15].

2.3 *Imperata cylindrica* (Mao Gen)

In Traditional Chinese Medicine (TCM), Mao Gen, also known as the dried rhizome of *Imperata cylindrica*, is highly valued for its medicinal properties. It has been traditionally used to clear heat, stop bleeding, and promote diuresis. Researchers have extensively studied *Imperata cylindrica* and have identified 72 compounds present in this plant. These compounds include saponins, glycosides, coumarins, flavonoids, and phenols which are considered as its primary phytochemical components [16].

Research on *Imperata cylindrica* water extracts has revealed significant diuretic effects in rabbits, which may be linked to nervous system effects and kidney function improvements, such as alleviating glomerular vasospasm and enhancing renal blood flow and filtration rate [17]. Moreover, extracts from *Imperata cylindrica* have been effective in stopping bleeding, enhancing platelet aggregation, and boosting both endogenous and exogenous coagulation systems in animal models [16].

The plant's aqueous extracts are reported to reduce inflammation in various animal models, suggesting potential protective effects on renal tissues and other organs. *Imperata cylindrica* also possesses strong antioxidant capabilities, on par with ascorbic acid, highlighting its potential in mitigating oxidative stress and related tissue damage [18].

Furthermore, both crude extracts and isolated compounds of *Imperata cylindrica* have exhibited anti-cancer properties, including inhibiting the proliferation of various cancer cell lines and inducing apoptosis in tumor cells [19; 20]. The plant extracts also have shown the ability to inhibit the growth of certain bacterial strains, indicating their potential as a source of antibacterial agents [21].

Imperata cylindrica has been found to enhance both innate and adaptive immune responses, including increasing the activity of macrophages and influencing T cell populations and cytokine secretion. Methanol extracts of the plant have demonstrated protective effects against liver damage in animal models, suggesting potential liver health benefits. Additionally, the plant extracts have shown other beneficial effects, such as antihypertensive actions and the regulation of lipid metabolism and tolerance to hypoxia, indicating a broad range of potential medicinal uses [16]. Studies conducted on a *Drosophila melanogaster* epileptic mutant model showed that extracts derived from *Imperata cylindrica* exhibited neuroprotective effects [22]. This finding indicates its potential application in neurological conditions.

Overall, the extensive research conducted on *Imperata cylindrica* supports its traditional use in TCM for various health benefits. The diverse range of bioactive compounds present in this plant offers numerous possibilities for further exploration and development of new therapeutic interventions.

2.4 Sugarcane

Sugarcane (*Saccharum officinarum*) is a tropical and subtropical crop that is widely cultivated mainly for its high sugar content. Sugarcane is not only an important sugar source, but also rich in a variety of nutrients and has a variety of modern pharmacological effects, making it a part of people's diet, as well as a component in traditional medicine.

Sugarcane is the main source of sucrose, which is a disaccharide composed of glucose and fructose. Sugarcane juice contains a large amount of natural sweetness, can provide energy for the human body, is an ideal natural thirst quenching drink. Especially in hot days, it can not only effectively replace the lost water, but also bring a cool feeling.

Sugarcane is a good source of minerals such as potassium, calcium, magnesium and iron, which are essential for bone health, blood circulation and nervous system function. Sugarcane also contains antioxidants, such as polyphenols and flavonoids, which can help protect against free radical damage and reduce the risk of disease.

The potassium in sugar cane helps maintain normal blood pressure levels, and the antioxidants help reduce the risk of cardiovascular disease. Sugar cane also promotes a healthy digestive system and alleviates constipation because it is rich in soluble fiber, which helps food move through the digestive tract [23].

2.5 Fig

The fig (*Ficus carica*) is a nutritious fruit that can be eaten fresh or dried. It originated in Western Asia and is now widely grown in warmer parts of the world. Figs are not only popular for their unique taste and texture, but also have a place in the modern diet due to their rich nutritional content and multiple health benefits.

Over 100 bioactive compounds, including β -amyriins, β -carotenes, β -sitosterols, arabinose, and xanthotoxol, have been identified in figs. Triterpenoids extracted from its roots, leaves, and latex are particularly prominent among these compounds. Figs are abundant in carbohydrates, minerals, lipids, phenolics, and enzymes while offering a high content of dietary fiber and carbohydrates. Essential minerals such as iron are present in figs at levels comparable to beef liver (50% abundance), along with other important minerals like calcium and potassium. The lipid composition of figs includes various fatty acids and sterols; sitosterol is the most predominant among them. Additionally, proteolytic enzymes such as diastase and lipase can be extracted from figs for commercial purposes [24].

Traditionally, figs have been used to aid digestion for their laxative properties. Modern pharmacological researches have highlighted figs' potent antioxidant, anti-inflammatory, antibacterial, anticancer, hepatoprotective, and antidiabetic activities. The high antioxidant capacity of fig fruits is

attributed to their abundant polyphenols, flavonoids, and anthocyanins. Figs' antibacterial action is effective against oral bacteria and various pathogens, while their anticancer potential is explored through different extracts, showing promise against liver cancer cells and inducing apoptosis. Studies also indicate figs' efficacy in mitigating liver damage, and antidiabetic research suggests figs can regulate abnormal carbohydrate metabolism, contributing to their potential in managing type 2 diabetes and supporting their use in nutraceuticals and biopharmaceuticals due to their diverse pharmacological activities [24; 25; 26].

3. Health effects

3.1 Respiratory health

The tea's ingredients support respiratory health through various mechanisms. Pears, enriched with vitamin C, have been associated with immune system enhancement, vital for respiratory defense [27]. The soothing effects of *Borassus flabellifer* fruits and Sugarcane on sore throats and coughs can be attributed to its palatability and gustatory appeal. The antioxidants in these components also contribute to the regulation of lung and respiratory inflammatory responses, showcasing their utility in cough relief and respiratory function improvement [11; 16; 23; 26].

3.2 Anti-inflammatory

Reducing inflammation is key to combating many health issues, including those affecting the respiratory system. The natural compounds in pear and *Borassus flabellifer* fruits that help reduce inflammation highlight the anti-inflammatory potential of the tea blend [11; 14; 15]. *Imperata cylindrica*'s contribution to this effect underscores the importance of traditional ingredients in modern anti-inflammatory remedies [28].

3.3 Antibacterial

The antibacterial properties of the tea's components are crucial for their health-promoting effects. The methanol, chloroform, ethyl acetate and hexane extracts of fig showed promising antibacterial properties against a variety of bacterial and fungal strains, including *Candida albicans* [26; 29]. *Imperata cylindrica*'s broad antimicrobial properties also hint at its role in fighting microbial invaders, although more direct research is needed [16].

3.4 Anticancer

The anticancer potential of this tea blend is derived from its rich content of bioactive compounds found in figs and *Imperata cylindrica*. These compounds, including triterpenoids from figs and various phytochemicals from *Imperata cylindrica*, have been researched for their ability to inhibit the proliferation of cancer cells and induce apoptosis. Studies have shown that figs possess compounds that can act against liver cancer cells, highlighting their potential in cancer prevention and therapy [24]. Similarly, *Imperata cylindrica* extracts have demonstrated anti-cancer properties in various studies, including the ability to stop the growth of certain bacterial strains which might contribute to reducing the risk of infections in cancer patients [16]. The synergy of these ingredients suggests the tea could support the body's natural defenses against cancer development.

3.5 Hepatoprotective activity

The hepatoprotective activity of this tea blend comes primarily from the fig component, which is known to have liver health benefits. Figs contain various antioxidants and phytochemicals that have been shown to protect the liver from damage by neutralizing harmful free radicals and reducing inflammation. Research indicates that figs can significantly lower markers of liver stress in animal models, suggesting their potential to improve liver function and prevent liver diseases [24]. The presence of *Imperata cylindrica*, with its protective effects against liver damage in animal studies, further enhances the liver-supporting qualities of the tea, making it a beneficial drink for maintaining liver health and function [16].

3.6 Antidiabetic activity

The antidiabetic activity of the tea is attributed to the beneficial effects of its components on blood sugar regulation. Figs are known to have a high fiber content, which can slow the absorption of sugar into the bloodstream, helping to regulate blood glucose levels [24]. Furthermore, research has indicated that both figs and *Imperata cylindrica* can contribute to the reduction of blood glucose levels. *Imperata cylindrica*, in particular, has been studied for its diuretic effects, which can also aid in managing diabetes by promoting the excretion of excess glucose through urine [16]. Together, these ingredients offer a natural approach to supporting blood sugar control, making the tea a potentially valuable addition to a diabetic diet.

3.7 Antioxidation

The antioxidant capacity of this tea blend is significantly enhanced by the synergistic effects of its ingredients, each contributing a unique set of antioxidants that combat oxidative stress within the body. Pears provide a rich source of vitamin C and flavonoids, known for their ability to neutralize free radicals and bolster cellular protection. *Borassus flabellifer* fruits add to the blend with their novel structured antioxidant polysaccharides, offering dose-dependent free radical scavenging activities that are crucial for mitigating the effects of aging, cardiovascular diseases, and diabetes. *Imperata cylindrica*, with its saponins, flavonoids, and phenols, not only supports this antioxidant action but also extends the tea's protective effects against DNA, protein, and lipid oxidation [16]. Sugarcane contributes with polyphenols and flavonoids, further reinforcing the tea's ability to prevent oxidative damage and support overall health. Lastly, figs, rich in β -amyryns, β -carotenes, and β -sitosterols, along with a diverse array of phenolic compounds, provide potent antioxidative benefits, ensuring comprehensive protection against oxidative stress and contributing to the prevention of chronic diseases [23]. This collective antioxidant mechanism of the tea blend plays a critical role in reducing inflammation, protecting against bacterial infections, and potentially lowering the risk of cancer and liver diseases, while also supporting diabetic health management.

4. Conclusion

Throughout this review, we've explored the amazing benefits of a unique herbal tea blend that includes pear, *Borassus flabellifer* fruits, *Imperata cylindrica*, Sugarcane, and figs. Each ingredient has its own rich history and potential health advantages, which all come together to make this blend incredibly effective in supporting respiratory health, providing antibacterial protection, reducing inflammation, and offering antioxidant defense (Table 1). These combined benefits not only make it a soothing beverage but also a powerful ally in promoting overall health and wellness.

Table 1: The bioactive effects of each ingredient

Medicinal Ingredient	Bioactive Effects	Chemical Components
Pear	Immune enhancement, respiratory hypersensitivity alleviation, anti-inflammation, antioxidation	Dietary fiber, Vitamin C, Flavonoids, Phenolic compounds
<i>Borassus flabellifer</i> fruit	Antitussive properties, pulmonary protection, antioxidation, lipid metabolism regulation, blood glucose reduction	Polysaccharides, Fats, Organic acids
<i>Imperata cylindrica</i>	Diuresis, hemostasis, anti-inflammation, antioxidation, antibacterial activity, anticancer properties, hepatoprotection, antihypertension, lipid metabolism regulation	Saponins, Glycosides, Coumarins, Flavonoids, Phenols
Sugarcane	Thirst quenching, energy provision, digestion promotion, antioxidation, blood pressure maintenance, cardiovascular disease risk reduction	Sucrose, Minerals, Polyphenols, Flavonoids
Fig	Digestion aid, antioxidation, anti-inflammation, antibacterial activity, anticancer properties, hepatoprotection, antidiabetic effect	amyryns, carotenes, sitosterols, Arabinose, Xanthotoxol, Triterpenoids, Dietary fiber, Essential minerals, Various fatty acids and sterols

As we conclude, the journey through the scientific and traditional perspectives on this herbal tea formula reaffirms the potential of combining time-honored herbal knowledge with modern nutritional and medical insights. By embracing such integrative approaches to health, individuals can harness the full spectrum of options available for maintaining and enhancing their well-being, setting a foundation for a healthier, more balanced life.

It is evident that this herbal tea is more than a mere beverage. This review invites readers, researchers, and practitioners alike to further explore and substantiate the health benefits of such herbal tea blends. By doing so, we not only honor the richness of our ancestral knowledge but also contribute to the ever-evolving landscape of natural health solutions.

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