

A Comprehensive Review on the Development of Functional Tisane Formulations

Nagam Santhi Priya¹, Pusuluri Siva Krishna², Puttagunta Srinivasa Babu¹, N S D M L Vasavi Polisetty¹, Purohit Mamatha¹, Mandadi Bharathi¹, Vetagiri Renu Bhargavi¹, Surya Venkat Vallabhaneni¹

¹Department of Pharmaceutics, Vignan Pharmacy College, India.

²Department of Pharmaceutical analysis, Vignan Pharmacy College, India.

Email: nsanthipriya89@gmail.com

Abstract:

Tisanes, or herbal infusions, have seen a surge in popularity due to their numerous health benefits and natural allure. Unlike regular teas, tisanes are caffeine-free and are made from a variety of plants, flowers, and herbs, each offering distinct flavors and therapeutic properties. This analysis explores the growing fascination with tisanes, fueled by current health trends and scientific studies. It sheds light on the potential health advantages, including better digestion, increased relaxation, and antioxidant properties, positioning tisanes as a valuable addition to a well-rounded lifestyle. This article provides a comprehensive understanding of tisanes, showcasing their role in promoting wellness and their promising future in the realm of natural health remedies.

Keywords: Tisanes; herbal infusions; caffeine-free; natural appeal; wellness; natural health remedies.

1. Introduction

In a world increasingly attuned to health and wellness, the quest for natural and beneficial beverages has never been more pronounced. Amid the crowded aisles of supermarkets and the curated menus of trendy cafes, tisanes have emerged as a compelling alternative to traditional teas and coffees. These herbal infusions, often imbued with a rich history and diverse cultural significance, are gaining recognition for their myriad health benefits⁽¹⁾ and alignment with contemporary health trends. As we become more mindful of what we consume, there's a noticeable shift towards plant-based and natural products.⁽²⁾ Tisanes, made from an array of

herbs, flowers, fruits, and spices, fit perfectly into this narrative.(3) Unlike conventional teas, which come from the *Camellia sinensis* plant,(4) tisanes are caffeine-free and cater to those looking for a soothing, holistic approach to their beverage choices.(5)

Recent studies highlight the significant health benefits of many herbs commonly found in tisanes. Chamomile, for example, is renowned for its calming effects, aiding in sleep and digestion.(6) Peppermint is noted for alleviating symptoms of irritable bowel syndrome (IBS) and its antimicrobial properties.(7) Meanwhile, hibiscus is drawing attention for its potential to lower blood pressure and boost heart health.(8) These findings align well with the growing public interest in natural remedies and preventative health care. Moreover, tisanes resonate with the broader wellness movement that emphasizes overall well-being and balance.(9) The simple act of preparing and enjoying a warm, fragrant cup of tisane can be a calming ritual, enhancing mental and emotional health.(10) This aspect of self-care, combined with the physical benefits of the ingredients, positions tisanes as a versatile and appealing choice for a wide population. Tisanes, often sourced from organic and fair-trade farms, fit well within this paradigm. The environmental impact of growing and harvesting herbs is generally lower than that of traditional tea and coffee production, adding another layer of appeal for eco-conscious individuals.

In essence, the increasing popularity of tisanes is driven by a blend of health awareness, cultural trends, and environmental considerations. As ongoing research continues to reveal the benefits of various herbs and as the wellness movement grows, tisanes are set to become a staple in the world of healthy beverages. Their rise is more than just a trend; it reflects a meaningful shift towards a more mindful and health-oriented way of living.

2. Definition

A tisane, often called herbal tea, is a soothing drink made by steeping various parts of plants like leaves, flowers, roots, or fruits served either in hot or cold water.(11) Unlike traditional teas that come from tea leaves, tisanes offer a wide range of flavors and health benefits, using ingredients such as chamomile for calming, peppermint for digestion, and hibiscus for its antioxidants.(12) These caffeine-free beverages are enjoyed not just for their taste but also for their natural healing properties, making them a popular choice for those embracing a holistic approach to health and wellness.(13)

3. Origin

The origin of tisanes, or herbal teas, is deeply rooted in ancient civilizations, where they were revered for their medicinal and therapeutic properties. The term "tisane" is derived from the Greek word "ptisane," initially used to describe a drink made from pearl barley.(14) This concept eventually expanded to encompass a wide variety of herbal infusions. Ancient Egyptians, Chinese, Indians, and Greeks all used herbal teas as remedies for various ailments.

Ancient Egypt

In Ancient Egypt, herbal infusions played a significant role in daily life and medicine. Herbs such as chamomile and peppermint were frequently used for their healing properties. The

Ebers Papyrus, an ancient Egyptian medical text dating back to around 1550 BCE,(15) documents the use of various herbs for treating ailments and promoting health.

Traditional Chinese Medicine (TCM)

In China, the tradition of consuming herbal infusions dates back thousands of years. Herbal teas have been an integral part of Traditional Chinese Medicine (TCM), with their usage documented in ancient texts like the “Shennong Ben Cao Jing” (The Divine Farmer's Materia Medica), which was compiled during the Han dynasty (206 BCE - 220 CE).(16) These texts highlight the therapeutic properties of numerous herbs and their role in balancing the body's energy.

Ancient Greece

The Greeks also have a rich history with herbal infusions. The word "tisane" comes from the Greek “ptisane”.(17) Over time, this term came to include a broader range of herbal drinks. Ancient Greek texts and practices frequently mention the use of herbal infusions for their health benefits.

Ayurveda

In India, the Ayurvedic system of medicine, which dates back over 5,000 years, has long utilized herbal teas for their health-promoting properties. Classic Ayurvedic texts like the "Charaka Samhita"(18) and the "Sushruta Samhita," written around 600 BCE, details the use of various herbs in treating diseases and maintaining wellness. Herbal teas in Ayurveda are often used to balance the three doshas (vata, pitta, and kapha), aiming to achieve overall harmony in the body.(19)

4. Importance of tisanes:

The rising popularity of tisanes also underscores a shift towards sustainable and natural health practices, supporting organic and ethically sourced ingredients for a healthier and more environmentally conscious lifestyle.(20) The allure of tisanes lies in their rich tapestry of flavors and therapeutic properties, derived from an array of botanicals such as flowers, leaves, seeds, and roots. Unlike traditional teas containing caffeine, tisanes are typically caffeine-free, making them ideal for those seeking relaxation without the jittery side effects. This makes them particularly beneficial for individuals with caffeine sensitivities or those looking to reduce their caffeine intake.

One of the foremost benefits of tisanes is their role in promoting mental and emotional well-being. tisanes are also potent allies in physical health. For instance, ginger tea is widely recognized for its anti-inflammatory and digestive benefits.(21) It can help soothe an upset stomach, reduce nausea, and even enhance the immune system. Another compelling aspect of tisanes is their versatility and the ability to blend various herbs to address specific health needs. A custom blend can be crafted to support immune function, improve digestion, or even detoxify the body.(22) For example, a mix of nettle, dandelion, and fennel can serve as a gentle detox, aiding the liver in flushing out toxins and promoting overall wellness.(23) In total, tisanes are far more than just a beverage. They are a bridge to a healthier, more balanced life,

offering a range of benefits from physical health support to emotional well-being and social connection.

Advantages of tisanes:

- Suitable for those sensitive to caffeine or seeking a calming beverage.(24)
- Helps reduce anxiety and promote relaxation.(25)
- Acts as a natural sleep aid, enhancing sleep quality.
- Aids in digestion and soothes upset stomach.
- Boosts the immune system.(26)
- These can be tailored to address specific health needs.
- It provides a natural energy boost and enhances mental focus.(27)
- Supports sustainable farming practices and environmental health.

Disadvantages of tisanes:

- Some individuals may have allergies to specific herbs.(28)
- Certain tisanes may interact with medications.
- The quality of tisanes can vary widely, affecting potency and flavor.
- Some herbs may not be safe for pregnant women, children, or people with certain health conditions.(29)
- Excessive consumption of some tisanes can lead to adverse effects.
- Herbal products are less regulated, leading to potential contamination or misinformation.
- The taste of tisanes may not appeal to everyone, limiting their popularity.
- Some tisanes lack extensive scientific research supporting their health claims.

5. Types of tisanes:

Tisanes come in a variety of types based on the parts of the plants used. They are:

i. Leaf tisanes: Leaf tisanes are herbal infusions made from the leaves of various plants.

Ex: Peppermint, lemongrass, and nettle.

ii. Flower tisanes: Flower tisanes are herbal infusions crafted from the petals of various plants.

Ex: Chamomile, hibiscus, and lavender.

iii. Fruit tisanes: Fruit tisanes are crafted using the fruits or peels of various plants.

Ex: Rosehip, apple, and citrus blends.

- iv. Root tisanes: Root tisanes are beverages made from the roots of plants.
Ex: Ginger, licorice, and dandelion root.
- v. Seed tisanes: Seed tisanes are herbal infusions crafted from plant seeds.
Ex: Fennel, anise, and cardamom.
- vi. Bark tisanes: Bark tisanes are prepared using the bark of various plants.
Ex: Cinnamon and slippery elm.
- vii. Berry tisanes: Tisanes made from berries are called berry tisanes.
Ex: Elderberry and raspberry leaf.
- viii. Spice tisanes: Spice tisanes are crafted using a blend of various spices.
Ex: Spices like cloves, cinnamon, and cardamom.

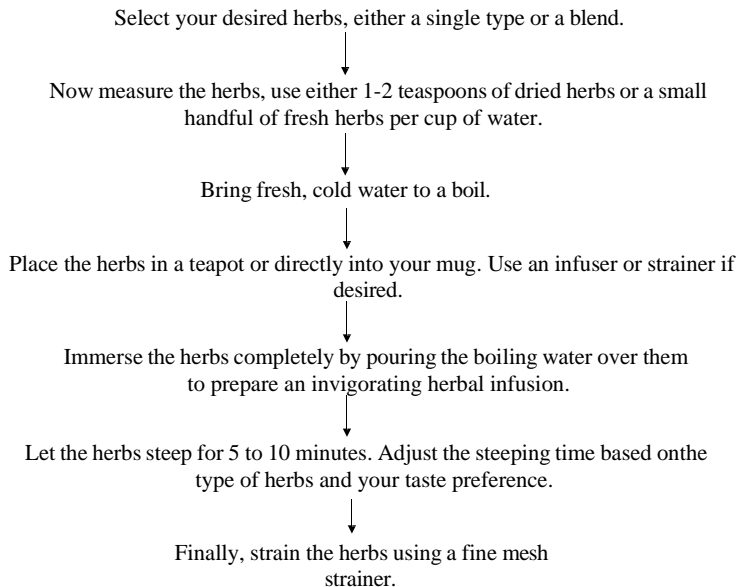


Fig 1: Herbs and spices. Adopted from (30)

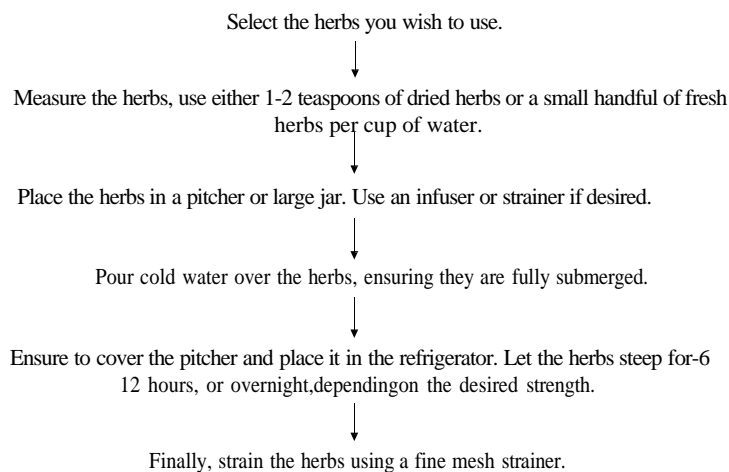
6. Preparation Methods for Tisanes:

Tisanes can be prepared using either hot or cold water, depending on your preference and the type of herbs used.

Hot Water Preparation:



Cold Water Preparation:



7. Formulation Challenges in Functional Tisanes:

Consistency of Active Compounds: One of the biggest formulation challenges in tisanes is ensuring consistency in the active ingredients from batch to batch. Plants naturally vary in their chemical makeup due to differences in soil quality, climate, harvest time, and processing methods. These variables affect the concentration of therapeutic compounds in herbal ingredients. For example, a plant harvested in early summer may have different levels of bioactive compounds compared to the same plant harvested later in the season. This inconsistency can impact the therapeutic effect of tisanes, making it challenging for manufacturers to guarantee the same quality and efficacy across all batches. Standardizing the extraction and processing methods, as well as implementing quality control measures, are essential to mitigate this variability.(31)

Stability and Shelf Life: Certain herbs and their active compounds are highly sensitive to environmental factors such as light, oxygen, and humidity. This sensitivity can result in a loss of potency over time, making it difficult to maintain the intended therapeutic effects until the product reaches the consumer. Herbs like chamomile and peppermint, for example, can degrade or lose their aromatic properties when exposed to air. To improve shelf life, many manufacturers explore preservation methods or use protective packaging that shields the ingredients from these environmental factors. However, balancing natural preservation methods with the demand for minimal additives is a significant challenge, especially in the natural health product industry, where consumers prefer fewer artificial preservatives.(32)

Flavor Balancing: Creating a tisane with both health benefits and a pleasant flavor profile requires skillful blending. Many herbs with potent medicinal properties also have strong, sometimes bitter flavors, which can make them less palatable. For instance, herbs like valerian root or dandelion are known for their bitterness, which can overpower milder herbs and turn off some consumers. To tackle this, formulators experiment with complementary herbs and natural flavor enhancers to create a more balanced and enjoyable taste. This process, however, involves trial and error to achieve the right flavor without compromising on therapeutic benefits.(33)

Solubility and Bioavailability of Active Ingredients: Many of the active compounds in herbs are not easily soluble in water, limiting their release and absorption when prepared as a tisane. Compounds like flavonoids and certain antioxidants require additional processing steps to enhance their solubility and bioavailability. Strategies such as grinding herbs into finer particles or adding emulsifiers can aid in dissolving these compounds more effectively. However, these methods must be carefully applied to avoid altering the natural characteristics of the herbs, as over-processing can lead to a loss of nutrients or essential oils.(34)

Allergenicity and Safety Concerns: Herbal ingredients can sometimes contain allergens or compounds that may interact with medications, creating safety risks for some consumers. For instance, chamomile, while popular in tisanes, is related to ragweed and may cause allergic reactions in sensitive individuals. Additionally, some herbs can lead to mild adverse effects or even serious contraindications if mixed with certain pharmaceuticals. To address this, manufacturers often emphasize thorough testing, allergen labeling, and consumer education, advising users on potential interactions and dosages. Safety testing and regulatory compliance are essential to ensure that consumers can use these products without unintended side effects.

8. Innovations in Formulation for Functional Tisanes

Microencapsulation of Active Compounds: Microencapsulation involves enclosing active ingredients within a coating or shell that protects them from environmental factors.(35) For functional tisanes, microencapsulation can extend the shelf life of delicate compounds and allow for controlled release of active ingredients.(36) For instance, sensitive antioxidants in green tea or chamomile can be microencapsulated to prevent oxidation, thereby maintaining their potency. This innovation also allows for more targeted delivery, as encapsulated compounds release more gradually, potentially enhancing their efficacy.

Freeze-Drying and Dehydration Techniques: Advanced dehydration methods, like freeze-drying, help preserve the delicate flavor, aroma, and potency of herbs used in tisanes.(37) Freeze-drying removes moisture while maintaining the structural integrity of active compounds. For herbal products, this process ensures that the therapeutic qualities of herbs are retained without the need for artificial preservatives. By preserving ingredients at their peak potency, freeze-drying supports a longer shelf life (38) and allows consumers to enjoy a fresher, more aromatic tisane experience.

Incorporation of Natural Preservatives and Antioxidants: To extend the shelf life of tisanes naturally, formulators have begun using natural preservatives like ascorbic acid (vitamin C) and antioxidants sourced from plants.(39) These compounds not only prevent spoilage but also enhance the therapeutic value of the tisane. For instance, rosemary extract is rich in antioxidants and has natural preservative properties, making it an ideal addition to prevent oxidation without compromising natural appeal. This innovation aligns with consumer demands for “clean-label” products, where artificial preservatives are minimized or avoided entirely.

Integration of Prebiotics and Probiotics: Some tisanes now include prebiotics and probiotics to support digestive health, aligning with current trends in gut health.(40) Prebiotics are non-digestible fibers that promote the growth of beneficial bacteria, while probiotics are live bacteria that offer various health benefits.(41) By combining these ingredients with traditional herbs, formulators create multifunctional tisanes that target both digestive and overall wellness. This dual-function approach has become popular, as consumers seek beverages that offer multiple health benefits in one serving.

Nanotechnology for Enhanced Solubility: Nanotechnology has emerged as a promising solution to the solubility challenge in herbal products. By breaking down herbal compounds into nano-sized particles, the bioavailability of beneficial compounds is increased, leading to faster and more efficient absorption by the body.(42) For example, curcumin, a compound in turmeric known for its anti-inflammatory properties, is not very water-soluble. When formulated using nanotechnology, curcumin particles can dissolve more easily in a tisane, allowing consumers to experience the full therapeutic effects with each cup.

Synergistic Blending of Complementary Herbs: To maximize therapeutic benefits, formulators are increasingly focusing on synergistic blends—combinations of herbs that complement and enhance each other's effects.(43) For example, a tisane meant to support relaxation might combine chamomile with lemon balm and lavender, as each of these herbs contributes to a calming effect. Synergistic blends are designed not only to amplify health

benefits but also to create a more balanced and enjoyable flavor profile. This approach has allowed formulators to create functional tisanes that are both effective and pleasant to drink, making herbal remedies more accessible to a wider audience.

9. Safety, toxicity, contraindications:

Safety: Functional tisanes are typically considered safe, particularly when prepared with well-known herbs. Nonetheless, their safety can vary based on the quality of the ingredients used, the lack of harmful contaminants such as heavy metals or pesticides, and compliance with suggested dosages.(44) Using high-quality herbal components and standardized extracts can further improve safety.

Toxicity: Most herbal tisanes are generally safe when consumed in moderation, but some herbs can be toxic if taken in large amounts or for extended periods. For instance, comfrey contains pyrrolizidine alkaloids, which can have harmful effects on the liver. It's also important to consider that specific herbs may interact with certain medications, so it's crucial to assess the toxicity profiles of individual herbs.(45)

Contraindications: Tisanes might not be appropriate for everyone. For instance, pregnant or breastfeeding individuals should steer clear of certain herbs, such as blue cohosh or licorice, because of possible negative effects.(46) Moreover, those with particular health issues, like liver or kidney disorders, should consult their healthcare providers before trying herbal tisanes.(47)

10. Future scope of tisanes:

The potential future impact of tisanes in the medical industry is substantial, as herbal medicine becomes increasingly integrated into mainstream healthcare. Ongoing scientific research continues to validate the therapeutic properties of various herbs, elevating tisanes to a recognized role in preventive and complementary medicine. Herbal teas are gaining attention in the medical community for their potential to manage stress, enhance immune function, improve digestion, and provide anti-inflammatory effects, among other health benefits.

A significant area of anticipated impact for tisanes lies in the management of chronic conditions. The anti-inflammatory and antioxidant properties of specific herbs may offer complementary support for patients with chronic illnesses such as arthritis, cardiovascular diseases, and diabetes. Further research into the mechanisms through which these herbs exert their effects could lead to the development of targeted herbal blends, offering a natural adjunct to conventional therapies. This aligns with the growing trend towards integrative medicine, which aims to optimize patient outcomes by combining traditional medical treatments with alternative therapies.

Additionally, the medical industry is expected to witness increased usage of tisanes in mental health support. Herbs renowned for their calming and anxiolytic properties, such as chamomile and lavender, are the subject of growing interest for potentially alleviating symptoms of anxiety,(48) depression, and insomnia. With the rise in mental health issues, tisanes could

prove valuable in holistic treatment plans, offering a natural and accessible option for patients seeking relief from psychological stress without the side effects associated with some pharmaceutical drugs.

In addition to therapeutic applications, tisanes are poised to play a role in preventive healthcare. With a rising emphasis on wellness and disease prevention, healthcare providers may recommend herbal teas as part of a healthy lifestyle regimen. Educational initiatives could inform patients about the benefits of incorporating tisanes into their daily routines, promoting overall well-being and reducing the risk of illness. As the medical industry continues to embrace a more holistic view of health, the integration of tisanes into both preventive and therapeutic strategies is likely to grow, offering a bridge between traditional herbal wisdom and modern medical practices.

11. Conclusion:

Tisanes have a captivating history and offer numerous benefits, showcasing the lasting appeal and effectiveness of herbal remedies. Coming from diverse cultures, these herbal infusions have evolved over centuries, transitioning from traditional remedies to a significant component of modern health and wellness routines. Their passage from ancient societies to present-day wellness trends highlights their widespread appeal and enduring value. Tisanes hold great significance due to their historical and cultural importance, as well as their diverse uses in modern health practices. They serve as a great caffeine-free option for individuals who want to avoid stimulants or are seeking relaxation. With a variety of ingredients like calming chamomile, energizing peppermint, antioxidant-rich hibiscus, and digestive aids like ginger etc. Tisanes can address a wide range of health needs and personal preferences. Whether enjoyed as a hot infusion for immediate comfort or a cold brew for a refreshing alternative, tisanes are adaptable to different lifestyles and climates. In essence, tisanes blend tradition and innovation, offering a multitude of health benefits grounded in historical wisdom and contemporary research. As the demand for natural health solutions continues to grow, tisanes are poised to play an increasingly important role in holistic wellness strategies, thanks to their ability to adapt to modern health needs while honoring their historical origins.

Declaration of Competing Interest

The authors declare that there are no conflicts of interest.

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None

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