

# **Development of functional herbal teas: An integrated valorization towards functional beverages**

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## **Abstract**

Tea is an aromatic beverage that has been consumed for centuries around the world. However, scientific communities have observed that the consumption of tea (high caffeine) resulted in adverse effects on human health. Hence, it is necessary to develop caffeine-free and natural beverages that would overcome this problem. Herbal teas are new emerging trends made from the infusion of plant leaves, seeds and/or roots, and spices. Therefore, we reviewed and compared different functional herbal teas around the world. Moreover, the health benefits of herbal teas and emerging trends in the herbal tea market are exclusively reviewed. Many plant-based herbal teas have been formulated with different functional ingredients and approved in US, EU, Japan, China, Brazil, and other countries. The beverage industry has recently started developing herbal teas and is expected to introduce more herbal tea products for health-conscious consumers due to their perceived functional, anti-aging, and medicinal properties. Overall, this review highlighted the development of functional herbal teas and its functional and medicinal properties. The growing trends in herbal tea market further initiated opportunities to discover and to design

novel strategies for the development of functional herbal teas and food product valorization at an industrial level.

**Keywords:** functional herbal teas, herbal tea market, beverage industry, functional foods

## **Introduction**

Tea is an aromatic beverage that has been consumed for centuries and discovered back in 2700 B.C<sup>1</sup>. Over the years, tea has received much consumer attention, which subsequently led to the processing of different types of tea. Generally, black (fermented), green (non-fermented), and oolong (semi-fermented) teas are considered as major tea types distinguished by the processing of harvested leaf <sup>2</sup>. An increasing number of studies have found evidence supporting the drinking of tea that could prevent cardiovascular <sup>3</sup> and human debilitating diseases <sup>2</sup>. This scientific evidence encouraged the tea drinking consumer market to improve tea processing with focus on food safety and to maintain good health standards. To meet this growing demand, different tea-based products entered the consumer market with a high content of caffeine (psychoactive drug naturally present in tea). A critical review on the safety of ingested caffeine highlighted the addition of synthetic caffeine in beverages, foods, and non-food products to increase their stimulant activities <sup>4</sup>.

After several years, the general and scientific communities have observed the adverse effects of caffeine on human health; for instance, a systematic review of effects of tea consumption on nutrition and health concluded that the consumption of a large amount of tea could affect nutritional and other health related problems due to caffeine content and the strong binding properties of tea polyphenols <sup>5</sup>. A report has claimed that caffeine ingestion adversely affects human health <sup>6</sup> and high consumption of caffeine-containing food products (for example, tea) are associated with the risk of heart and other health conditions <sup>4</sup>. This represented a major problem

in the food industry to develop caffeine-free and natural beverages. Recently, interest has been growing on caffeine-free beverages that would overcome this problem. Moreover, several emerging trends and advanced technologies in the beverage industries increased consumer expectations for the development of novel functional beverages. One way to overcome this problem is the development of functional herbal teas, which are derived from plant sources and caffeine-free that preserves the same taste and aroma characteristics as tea. Herbal teas are new emerging trends made from the infusion of plant leaves, seeds and/or roots, and spices.

Until now, there has been no report of any systematic review on functional herbal teas; therefore, the main purpose of this short review was to compared different functional herbal teas around the world and the health benefits of herbal teas and its trends in the herbal tea market.

### **Consumption of herbal teas**

Over the past years, the consumption of herbal tea is increasing due to its health benefits in the national and international market. Several studies have been reported the many health benefits of herbal teas and also highlighted that consumption of herbal teas might reduce the blood related abnormalities <sup>7</sup>. For example, consumption of red raspberry leaf tea was used to treat various health ailments and induce labor during pregnancy. Many researchers documented the medicinal uses of herbal teas as shown in Table 1. For instance, consumption of 1 cup (children 0.25 tsp/day) of Chamomile herbal tea contributed to the reduction of anxiolytic, diarrhea, and relief in the gastrointestinal tract. Similarly, consumption of cinnamon herbal tea (1 cup/day) lowers the blood glucose, LDL cholesterol, and allergic reactions. According to Health consumption of herbal teas (citrus peel, lemon balm, ginger, orange peel and rosehip) 2–3 cups/day is recommended during pregnancy and breastfeeding <sup>8</sup>. Recently, da Silva, Batista, Cazarin, Dionísio, de Brito, Marques, Maróstica Junior <sup>9</sup> developed a functional tea from a Brazilian berry and suggested that the

Brazilian berry can be used as a tea beverage to take the advantages of the antioxidants present in the berry. This indicated that the consumption of herbal teas based on recommended doses could impact on various degenerative diseases.

Table 1. different types of herbal tea and their consumption doses<sup>†</sup>

<b>Herbal tea</b>	<b>Consumption doses</b>
Valerian	Infusion: 0.5 to 1 tsp dried root in 1 cup water Sleep aid: Drink 1 cup before bed. Anxiety: Drink 1 cup (three times a day: TID).
Peppermint	Infusion: 1 to 2 tsp dried leaves in 1 cup water for 5 minutes. For Irritable bowel syndrome, consider tablets (200 mg TID).
Nettle	Infusion: 2.5 tsp dried root in 1 cup water for 5-10 min. Drink 1 cup tea BID-TID.
Rosemary	Infusion: 2 to 3 tsp crushed leaves in 1 cup water for 5-10 min. Drink 1 cup tea TID.
Lemon balm	Infusion: 2 to 4 tsp leaf in 1 cup water for 5-10 min. Sleep aid: Drink before bed. Anxiety: Drink 1 cup tea BID and TID.
Ginger	Infusion: 1 tsp root in 1 cup water, take TID. Migraine: 1 tsp at start of headache, repeat in 4 h (max 4 tsp/24 h).  Childhood diarrhea: piece of ginger root the size of child's little finger steeped for 5-10 min.
Cinnamon	Infusion: 0.5 to 3 tsp cinnamon bark in 1 cup water for 5 min. Drink 1 cup tea daily (may steep black teabag with bark for flavor if desired).
Fennel	Infusion: 1.5 to 4 tsp crushed fruit or seed in 1 cup water. Take 1 cup tea TID.

Children: 0.04tsp/lb/day not to exceed adult dose.

Chamomile      Infusion: 1.5 to 5 tsp dried flower heads in 1 cup water for 5-10 min. Drink 1 cup tea TID. Children: 0.25tsp/lb/day not to exceed adult dose.

Motherwort      Infusion: 2 to 3 tsp dried stems, leaves, flowers in 1 cup water for 5-10 min. Drink 1 cup tea TID.

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<sup>†</sup>Source: <https://www.fammed.wisc.edu>

### Herbal tea sources around the world

Traditionally, herbal teas have been consumed for centuries as a part normal diet to reduce many diseases. The study reported by Chandrasekara, Shahidi <sup>8</sup> documented the different medicinal claims of using herbal teas as a medicine. In general, each herbal tea is designed for a specific medicinal benefit that was prepared using different herbal sources (Table 2). For example, Asians prepare herbal teas with different sources and other places like Africa and Europe uses different sources to prepare herbal teas as shown in Table 2.

Table 2. Different sources of herbal teas around the world<sup>†</sup>

Place	Sources
Asian herbal teas	<i>Centella asiatica</i> , Arabian jasmine, Balsam pear, barley grass, guava, hardy rubber tree, Japanese persimmon, Jobs tears, Wolof berry tea, <i>A. marmelos</i> (bael), Tanner's Cassia ( <i>Cassia auriculata</i> )
African herbal teas	African rooibos ( <i>Aspalathus linearis</i> ), borututu ( <i>Cochlospermum angolensis</i> ), and honey bush tisanes.
South America herbal teas	Yerba mate ( <i>Ilex paraguariensis</i> ) and Kombucha tea.

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European herbal teas

*Chamomilla recutita*, *Matricaria chamomilla*, *Chamaemelum nobile*. and Peppermint tea (*Mentha piperita* leaves).

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<sup>†</sup>Source: Chandrasekara, Shahidi <sup>8</sup>

## **Herbal tea market around the world**

Recent trends in the herbal tea market have increased globally due to its health benefits in the consumer market. A recent report by Market Watch (2018)<sup>10</sup> segmented into North America, Europe, Asia Pacific, Latin America, and Middle East & Africa based on the raw material, flavor type, product type, packaging type, and region. Asia Pacific regions are expected to dominate the global market followed by North America. Another survey conducted by Research and Markets (2018)<sup>11</sup> highlighted the reasons for increased trends in the global herbal market including change in consumer taste and urbanization, which led to the developments in the herbal tea market. Moreover, many herbal tea formulated products have been approved in the US, EU, Japan, China, Brazil, and other countries.

## **Conclusions and future directions**

Overall, the herbal tea industry is expected to introduce more herbal tea products (with rich bioactive compounds) due to higher demand in the consumer market. The growing trends in the herbal tea market further created opportunities to discover and to design novel strategies in the beverage industry for the development of functional herbal teas at an industrial level.

## **Conflict of interest**

The authors declare no conflict of interest.

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