



## FORMULATION AND SENSORY EVALUATION OF TISANES

**BENNET R\*, S. VIJAYALAKSHMI, DINESH RAJ R, J. YUVARAJ**

*School of Catering and Hotel Management, Vels University, Chennai, India*

### ABSTRACT

Tisane is a beverage infused with herbs instead of tea leaves. The main objective of the study was to formulate and analyse the herbal infusions without any tea leaves and caffeine free alternative to tea or coffee for a hot drink, to perform a sensory evaluation on 2 different herb infusions (tisanes) prepared from formulations of indigenous herbs and spices and to analyse for its biochemical and nutrient content. Tisanes infuse from product Code A- , composed of Justicia adhatoda, ocimum basilicum, Origanum vulgare, Zingiber officinale and Piper nigrum.and Code B- composed of Zingiber officinale,Piper longum, Myristica fragrans, Terminalia chebula, Nigella sativa. Thirty (30) trained panelists conducted acceptance tests on infusions from 2 formulations using 5 point hedonic scale. The mean scores of Code A and Code B were found. The highest mean score of the product Code A was further analyzed further for its biochemical and nutrient content. The mean score of the sensory attribute results showed that overall acceptability of product for the tisane Code A was slightly greater than that of tisane Code B. There was significant difference between Code A and Code B since the p value is lesser than that of t value ( $p < 0.05$ ). Code A was found for the presence of significant amount of poly phenol, calcium, iron and sodium. These results were confirmed it is promising that potential for introducing a consumer acceptable Code A tisane into the market.

**KEY WORDS:** tisane, Sensory evaluation, herbal infusion, Hedonic scale, Nutrient content



**BENNET R**

School of Catering and Hotel Management, Vels University, Chennai, India

\*Corresponding author

## INTRODUCTION

Tisane is a generic term for tea made from herbs instead of leaves of tea plant. In today's western world tea serves as a beverage for enjoyment as well as for herbal therapies. Tisane or herbal tea is any beverage made from the infusion or decoction of herbs, spices or any other plant material in hot water and usually does not contain caffeine<sup>1</sup> and used as a beverage or for medicinal effects. Common herbs infused to prepare tisanes are aniseeds, ginger, mint, ginseng, jasmine, chamomile, Echinacea, cocoa leaves, cinnamon sticks, cocoa bean, citrus peel (lemon & orange), lemon grass, neem leaves, roasted barley, rosemary, thyme etc. In recent times, however tisane, is gaining increasing popularity among consumers. Types of tisanes Tisanes are usually categorized by what part of the plant they come from. Leaf tisanes such as lemon balm, mint, lemon grass, and French verbena. Flower tisanes- rose, chamomile, hibiscus and lavender. Bark tisanes- cinnamon, slippery elm and black cherry bark. Root tisanes- ginger, echinacea and chicory. Fruit/berry tisane- raspberry, blueberry, peach and apple. Fruit/berry tisane- raspberry, blueberry, peach and apple. Health benefits of tisanes Tisanes are popular because of their fragrance, antioxidant properties and therapeutic applications. Tisanes are often consumed for their physical or medicinal effects, especially for their stimulant, relaxant or sedative properties. The medicinal benefits of specific herbs are often anecdotal or controversial. Folklore has long heralded the health benefits of several popular tisanes but clinical evidence on the effectiveness of peppermint chamomile and hibiscus infusions is scarce. The anti microbial, antioxidant and anti-platelet – clumping activity of chamomile tisanes as well as the fact that hibiscus tisanes significantly lowered blood pressure in hypertensive patients.<sup>3</sup> Peppermint was shown to have significant antimicrobial and antiviral activities, strong antioxidant and antitumor actions and some antiallergenic potential. When animals were fed either moderate amounts of ground leaves or leaf extracts researchers also noted a relaxation effect on gastrointestinal tissue and analgesic effect in the nervous system.<sup>3</sup> Health risks of tisanes As tisanes can literally be composed of any plant material, including some plants that are known to be toxic, the specific ingredients must be checked for health and safety individually. Most retail tisanes sold as beverages could be considered safe, but medicinal tisanes could easily contain herbs that cause damage in large amounts. While most tisanes are safe for regular consumption, some herbs have toxic or allergenic effects. Among the greatest causes of concern is Comfrey, which contains alkaloids that can cause permanent liver damage with chronic use. and Lobelia, which contains toxins similar in effect to nicotine.<sup>4</sup> Tisanes can also have different effects from person to person, and this is further compounded by the problem of potential misidentification. The deadly foxglove, for example, can be mistaken for the much more benign (but still relatively toxic to the liver) comfrey.<sup>4</sup> All herbal preparations should be checked for toxic chemical residues to allay consumer fears of exposure to known neuro-toxicant pesticides and to aid in promoting global acceptance of

these products.<sup>5</sup> In this study the different herbs were infused and prepared the two different tisanes by reviewing with traditional medicinal benefits of the herbs and spices. The leaf of *Adhatoda vasica*, is an important drug in Ayurveda, Unani systems of medicine<sup>6</sup> where it is prescribed as an expectorant<sup>7</sup>, for curing intestinal worm infections in the indigenous system of medicine of Naga tribes in India and to treat asthma and cough<sup>8</sup>. In Ayurveda Basil leaves have been well certified for its therapeutic potentials and described as anti-athmatic and anti-kaphic drugs.<sup>9</sup> Oregano is used to treat respiratory tract disorders, gastrointestinal (GI) disorders, menstrual cramps, and urinary tract disorders and this herb is also applied to treat a number of skin conditions, such as acne and dandruff. Oregano contains: fiber, iron, manganese, vitamine E, iron, calcium, omega fatty acids, manganese, and typtophan<sup>10</sup>. Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines, and hypertension.<sup>11</sup> Research data indicates that Ginger is used as anti cancer, anti oxidant, anti-inflammatory compound, and it also acts as to reduce cholesterol and thereby it is very much useful in the prevention of cardio vascular diseases and diabetes.<sup>12</sup> Black pepper has been traditionally used in the treatment of fever and malaria, enlarged spleen, epilepsy, depression, respiratory diseases such as asthma and chronic bronchitis.<sup>13</sup> Nutmeg has been proven for its tremendous health benefits such as brain booster, tonic for the heart, detoxifier for kidney and liver, induces sleep, removes bad breath, treats stomach disorders, pain reliever, and is also used in used in cough syrup. It is also considered as an aphrodisiac.<sup>14</sup> *Terminalia chebula* has traditionally been used in the treatment of asthma, sore throat, vomiting, hiccough, diarrhoea, bleeding piles, gout and heart and bladder diseases.<sup>15</sup> The black cumin oilseed had been shown to be anticancer, anti-diabetic, antiradical and immune-modulator, analgesic, antimicrobial, anti-inflammatory, spasmolytic, bronchodilator, hepatoprotective, antihypertensive and renal protective.<sup>16</sup> Long pepper has been found to have immunomodulatory, anti-oxidant, anti-asthmatic, anti-carcinogenic, anti-inflammatory, anti-ulcer, and anti-amoebic properties.<sup>17</sup> The objective of this research article was to prepare two different tisanes (Code A and Code B) from formulations of indigenous herbs and spices: Code A: *Justicia adhatoda* (Malabar nut), *Ocimum basilicum* (Basil), *Origanum vulgare* (Oregano), *Zingiber officinale* (Ginger), *Piper nigrum* (Black pepper); Code B: *Myristica fragrans* (Nutmeg), *Terminalia chebula* (Chebulic myrobalan), *Nigella sativa* (Black cumin), *Zingiber officinale* (Ginger) and *Piper longum* (Long Pepper). To find out consumer acceptance of two tisanes (Code A & Code B) by means of sensory evaluation and to analyse Code A for its nutrient content as the mean score of Code A was high.

## MATERIALS AND METHODS

- Materials
- Herbs and spices

Two different tisanes (Code A and Code B) were prepared for this study. The formulations of indigenous herbs and spices used for Code A: *Justicia adhatoda*

(Malabar nut), *Ocimum basilicum* (Basil), *Origanum vulgare* (Oregano), *Zingiber officinale* (Ginger), *Piper nigrum* (Black pepper) and for Code B: *Myristica fragrans* (Nutmeg), *Terminalia chebula* (Chebulic myrobalan), *Nigella sativa* (Black cumin), *Zingiber officinale* (Ginger) and *Piper longum* (Long Pepper). The other ingredients used in the formula of tisanes were:

Brown sugar, honey and water. Collection of ingredients *Justicia adhatoda* leaves were collected from forest area in Melmaruvathur, Tamil Nadu and the other herbs and spices were purchased from certified ethnic shop and market in Thambaram, Chennai. All the herbs and spices purchased to prepare tisane were smelt and checked for its high quality. Preparation of formulation.

**Table 1**  
**Composition of tisanes formulation with different proportions of herbs and spices (per 100 ml of water)**

Product Code	Herbs	Parts Used	Proportion
Code A	<i>Justicia adhatoda</i>	Central part of Leaf	2 gm
	<i>Ocimum basilicum</i>	Leaf	5 gm
	<i>Origanum vulgare</i>	Leaf	3 gm
	<i>Zingiber officinale</i>	Root	10 gm
	<i>Piper nigrum</i>	Fruit (whole)	10 gm
Code B	<i>Myristica fragrans</i>	Seed (powder)	10 gm
	<i>Terminalia chebula</i>	Seed (powder)	10 gm
	<i>Nigella sativa</i>	Seed (powder)	10 gm
	<i>Piper longum</i>	Fruit (powder)	15 gm
	<i>Zingiber officinale</i>	Dry root (powder)	10 gm

#### **Preparation of tisane**

Tisanes were prepared in the same way as tea. The amount of herbs and spices to be infused, were determined by first trying-out on smaller quantities, until they produced desirable sensory effects. The results obtained from these trials were followed for infusing the ingredients in the final product of the two tisanes.

#### **Procedure for tisane**

The two tisanes were prepared from a combination of several herbs and spices depending on desired result and flavour. For Code A tisane, near boiling water was infused over the herbs and spices listed in the table 1 in a vessel and left to steep until the desired concentration was achieved about five minutes. The tisane was strained prior to serving and it was sweetened with palm sugar. The same procedure carried out for Code B but it was served with honey. Sensory evaluation These sensory evaluation methods are widely used both by the food industry and academics. Sensory analysis of food relies upon evaluation by our senses (odour, taste, colour, tactile, temperature, pain etc). Only by applying exact scientific testing methods can reproducible results be obtained and analysed statistically.<sup>18</sup>In the present study the sensory evaluation was carried on the two tisanes to find out the acceptance level of Code A and Code B with 30 trained and experienced panellists of Young SKALL members and faculty of Hotel and Catering Management from the Vels University, Tamil Nadu, India and completed the questionnaire. Sample infusions were coded A and B and served randomly to panellists. About 30 ml of each infusion was served in a 50 ml cup. Two samples were served at a time. The sample infusions were approximately 60 °C to 70 °C at the time of tasting. The tests were carried out in ten minutes time. Unsalted crackers and water were provided to each member of the panel after testing the first sample.<sup>19</sup>The sensory acceptance includes taste, colour, aroma and temperature. Panel members scored their accepted level on a 9-point Hedonic scale. In this approach numbers from 1 to 9 were assigned to the

scale's nine category and nine was indicated 'like extremely' and one was indicated 'dislike extremely'.

#### **Statistical analysis**

Sensory scores distributions were dealt by usual statistical procedures. The mean and the difference between mean (t-test) of two tisanes was calculated. The mean score obtained for code A was high and there was significant difference between the Code A and Code B tisane. Hence code A was taken further for its nutritive analysis.

#### **Evaluation of nutritive and biochemical value**

The highest mean score of the product, Code A was analyzed further for its biochemical and nutrient content which includes poly phenol, energy, carbohydrate, fat, dietary fibre, calcium, iron and sodium. The energy was calculated by FAO method.<sup>20</sup> The proximate nutrients' composition such as total fat, protein, dietary fibre, sodium and iron of Code A tisane was determined according to AOAC method.<sup>21</sup> Carbohydrates were determined by difference method.<sup>22</sup>

#### **Determination of total polyphenol**

Total polyphenol in Code A tisane was determined by colorimetric method using Folin- Ciocalteu reagent. The preparation of the tea extract was performed according to the method published by the International Organization for Standardization (ISO 14502-1)<sup>23</sup> with some minor modifications. The total polyphenol content was expressed as gallic acid equivalents (GAE, units: g/100 ml of the sample).

## **RESULTS AND DISCUSSION**

#### **Sensory evaluation**

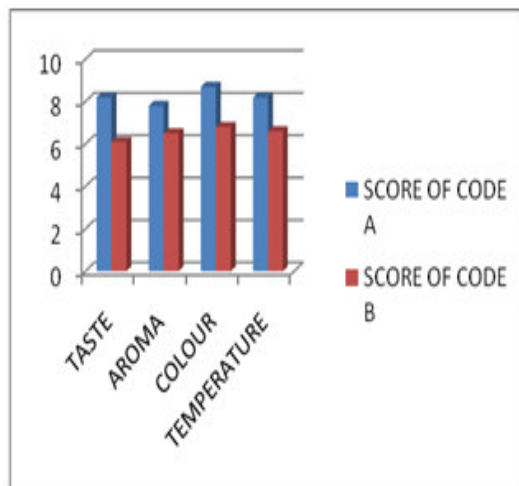
Infusion could lead to the production of delightful and delicious tisane with improved organoleptic quality and high nutritive value. The infusion increases taste, aroma and nutrients of tisane. When infusing the herbs and spices with boiled water, the mixing is done with a view

to elevate the properties of the original herbal tea and avoid undesirable changes. Colour has a major impact on the sensory properties of tisane, and has a significant

effect on the ability to identify flavour or aroma within the tisanes, when colour was appropriate for aroma correct identification of the aroma is observed.

**Table 2**  
**Mean Score of Tisanes**

Sensory Attributes	Code A	Code B
Taste	8.2	6.1
Aroma	7.8	6.5
Colour	8.7	6.8
Temperature	8.2	6.6



**Figure 1**  
**Mean Score of Sensory Evaluation of Tisanes**

Data in Table (2) and Figure (1) revealed that the Code A tisane infused with *Justicia adhatoda* (Malabar nut), *Ocimum basilicum* (Basil), *Origanum vulgare* (Oregano), *Zingiber officinale* (Ginger), *Piper nigrum* (Black pepper) had the highest mean scores of colour (8.7), taste and temperature (8.2) and aroma (7.8) comparatively with Code B tisane. The Code B products infused with *Myristica fragrans* (Nutmeg), *Terminalia chebula* (Chebulic myrobalan), *Nigella sativa* (Black cumin), *Zingiber officinale* (Ginger) and *Piper longum* (Long

Pepper) obtained scores ranging 6.1, 6.5, 6.6 and 6.8 for the sensory attributes like taste, aroma, temperature and colour respectively. There was a significant difference between the two tisanes – Code A and Code B (significant at  $p < 0.05$ ). The 't' value is 7.31 and the p value is 0.000167. Determination of proximate nutrient analysis (code A – tisane) The proximate nutrient analysis of Code A tisane was determined. The results expressed on 100 ml of weight basis, are presented in table 3.

**Table 3**  
**Proximate Nutrient Analysis**

S.NO	PARAMETERS	METHODS	UNITS	RESULT
1.	Energy(By Calculation)	FAO Method	Kcal/100ml	0
2.	Carbohydrate (By Difference)	CTL/SOP/FOOD/262-2014	g/100ml	BDL(DL:0.5)
3	Total Fat	AOAC 19th Edn.2012,1954.02	g/100ml	BDL(DL:0.1)
4	Protein (NX6.25)	AOAC 19th Edn.2012,920.152	g/100ml	0.19
5	Dietary Fibre	AOAC 19th Edn.2012,985.29	g/100ml	BDL(DL:0.5)
6	Sodium as NA	AOAC 19th Edn.2012,969.23	Mg/100ml	44
7	Calcium as Ca	IS 5949:1990(RA.200)	Mg/100ml	71
8	Iron as Fe	AOAC 19th Edn.2012,999.11	Mg/100ml	0.36
9	Total Polyphenol as Gallic Acid	ISO 14502-1	Mg/100ml	972

BDL- Below Detection Limit; DL-Detection Limit; NA- Not Available The nutritional value of serving of 100 ml Code A tisane as a source of sodium, calcium, iron and poly phenol compound. There was evident for the presence of sodium and it was estimated 44 mg per 100 ml of the

sample. The Calcium (Ca) and Iron content of the sample was relatively high and calcium showed 71mg whereas iron showed 0.36 mg per 100 ml of the sample. Besides their nutritional significance, minerals may also influence the sensory character of beverages. According

to Fennema (1996), Calcium in foods is mostly present as  $\text{Ca}(\text{OH})_2$ , forming  $\text{Ca}^{2+}$  and  $\text{OH}^-$  ions in aqueous solution. Because these ions are alkaline, they increase the pH of the solution, making the solution less acidic and therefore less sour. Determination of total polyphenol content of the product code A The total phenol content of Code A tisane expressed in mg/100ml gallic acid equivalents is summarized in Table 3. Total polyphenol as galic acid was found 972mg/ 100 ml. It is well known that plant phenols in general are highly effective free radical scavenging and antioxidants.

## CONCLUSION

In this study two tisanes (Code A and Code B) were prepared and sensory evaluation carried out for them. The highest sensory score was found for Code A tisane and this was taken further for its nutrient and biochemical analysis. It was proven that the Code A tisane for its minerals content such as sodium, calcium and iron and for its total polyphenol content as galic acid. These results demonstrated that potential for introducing a consumer acceptable Code A tisane into the market. It is well understood from this study that the true benefits of tisanes are all the rage for the many medicinal qualities they are supposed to possess.

## REFERENCES

- Herb tea. [Internet]. [cited 2016 April 22] Available from: [www.ictionary.com/browse/herbal-tea](http://www.ictionary.com/browse/herbal-tea)
- Lindsey Goodwin, Tisane /Herbal Infusion Basics. [cited 2016 March 10] Available from: <http://coffeetea.about.com/od/teaandtisanebasics/a/TisaneBasics.html>
- Dan Bolton. Researchers Validate Tisane Health Benefits, World Tea News. [updated 2011; cited 2016 March 20] Available from: <http://worldteanews.com/news/researchers-validate-tisane-health-benefits>
- Tisanes. [cited 2016 March 8]. Available from: <http://www.oilsandplants.com/tisanes.html>.
- Vijay Naithan and Poonam Kakkar. An Evaluation of Residual Organochlorine Pesticides in Popular Indian Herbal Teas. Archives of Environmental Health- An International Journal. 2004;59(8):426-30
- Kumar M, Samarth R, Kumar M, Selvan SR, Saharan B and Kumar A. Protective effect of *Adhatoda vasica* Nees against radiation-induced damage at cellular, biochemical and chromosomal levels in Swiss albino mice. Evidence Based Complementary and Alternative Medicine. PMID:PMC 1978234: 2007; 4(3): 343-350
- Soni S, Anandjiwala S, Patel G and Rajani M. Validation of Different Methods of Preparation of *Adhatoda vasica* Leaf Juice by Quantification of Total Alkaloids and Vasicine. Indian Journal of Pharm Sci. 2008;70(1):36-42
- Ignacimuthu S and Shanmugam N. Antimycobacterial activity of two natural alkaloids, vasicine acetate and 2-acetyl benzylamine, isolated from Indian shrub *Adhatoda vasica* Ness. leaves. Journal of Bioscience. 2010;35(4):565-70
- Sirkar NN. Pharmacological basis of Ayurvedic therapeutics. In: Cultivation and utilization of medicinal plants. Editors: Atal CK and Kapoor BM. PID CSIR. 1989
- Joseph Nordqvist. Oregano: Health Benefits, Side Effects. [updated 2015 September 28; cited 2016 March 16]. Available from: <http://www.medicalnewstoday.com/articles/266259.php>
- Nicoll R and Henein M. Y. Ginger (*Zingiber officinale* Roscoe): A hot remedy for cardiovascular disease. Int J Cardiol. [PubMed]:18037515. 2009;131(3):408-9. Available from: [www.ncbi.nlm.nih.gov/pubmed/18037515](http://www.ncbi.nlm.nih.gov/pubmed/18037515)
- Bode AM, Dong Z. The Amazing and Mighty Ginger. In: Benzie IFF, Wachtel-Galor S, Editors. Herbal Medicine: Biomolecular and Clinical Aspects. 2nd ed. Boca Raton (FL)- CRC Press/Taylor & Francis:2011. Chapter 7. Available from: <http://www.ncbi.nlm.nih.gov/books/NVK92775/>
- Dr. Majeed and Prakash .L, The Medicinal uses of Pepper, international pepper, No 1 Jan-Mar 2000. 23-31 Available from: [naturalingredient.org/wp/wp-content/uploads/2000themedicinalusesofpepper](http://naturalingredient.org/wp/wp-content/uploads/2000themedicinalusesofpepper)
- Agbogidi O.M. and Azagbaekwe O. P. Health and Nutritional Benefits of Nut meg (*mystica fragrans* houtt.). Scientia Agriculturae. PSCI Publications.2013;1(2): 40-44. Available from: [www.pscipub.com/SA](http://www.pscipub.com/SA)
- Kirtikar KR and Basu BD: *Terminalia chebula*. In Kirtikar KR, Basu BD, Editors. Indian Medicinal Plants. 2. Vol.1. Allahabad: Lalit Mohan Basu Publications.1935; pp. 1020-1023

Developing new tisane products from indigenous plants will provide novel uses for underutilized plants. Like beverages made from true teas, tisanes can be served hot. It will further provide consumers with new alternatives to traditional teas. Future studies should investigate this herbal preparations should be checked for toxic chemical residues to allay consumer fears of exposure and to aid in promoting global acceptance of these products at the levels of marketing activities which will best support the successful introduction of tisane in Asian markets.

## ACKNOWLEDGEMENT

We sincerely thank Chennai Testing Laboratory, Guidy, Chennai, Tamil Nadu, India for testing our sample Code A and identified for its nutrient content and biochemical compounds. We extend heartfelt thanks to all the panel members who had participated in the sensory evaluation test and helped us for this completion of this research work.

## CONFLICTS OF INTEREST

Conflict of interest declared none.

16. Mohamed Fawzy Ramadan. Nutritional value, functional properties and nutraceutical applications of black cumin (*Nigella sativa* L.): an overview. *International Journal of Food Science & Technology*. 2007;42 (10): 1208-1218.
17. Murlidhar Meghwal and T. K. Goswami, Piper nigrum and Piperine: An Update. *Phytother. Res.*, 27: 1121–1130. Doi10.1002/ptr.4972. 2013
18. Jellinek G. *Sensory Evaluation of Food - Theory and Practice*, 17 ed. Ellis Horwood Ltd, Chichester, UK. 1985
19. Akande GR, Emokpae AO, Towuru ET, Ogbonna C and Ajayi A. Proximate composition, Microbiological and Sensory evaluation of canned skipjack tuna (*Katsuwonus pelamis*) stored at ambient and accelerated temperatures. Nigerian Institute for oceanography and Marine Research Technical Paper No 38: 1988;1-12. Available from: [www.oceandocs.org](http://www.oceandocs.org)
20. FAO. Food and Energy- Methods of analysis and conversion factors. Report of a Technical Workshop, Rome. 2002;Chapter 3.
21. AOAC Association of Official Agriculture Chemists. Washington Dc, USA. 1984.
22. Victor C. Myers and Hilda M. Croll. The Determination of Carbohydrates in Vegetable Foods. *Journal of Biol.Chem.* 1921;46:537-551.
23. International Standard- ISO 14502-1, Ed.1. 2005.