IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

ISSN PRINT 2319 1775 Online 2320 7876

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TISANES: AN OVERTURE TO A DISCOURSE ON THE TEA WITHOUT CAFFEINE

Upasana Deb[1] and Sheena Haorongbam[2*]

[1]Ph.D Research Scholar, Department of Agri-business Management and Food Technology, North-Eastern Hill University, Tura Campus, Tura, Meghalaya

[2]Assistant Professor, Department of Agri-business Management and Food Technology, North-Eastern Hill University, Tura Campus, Tura, Meghalaya

[*]**Corresponding author:** Dr. Sheena Haorongbam, Department of Agri-business Management and Food Technology, North-Eastern Hill University, Tura Campus, Tura, Meghalaya.

Abstract

Tea is widely consumed in the world and has a special place in the life of tea lovers. However, the tea along with its goodness also delivers small amount of caffeine to the consumers. Since, excess of everything is bad, huge accumulation of caffeine may lead to dysfunctioning of the normal mechanism of the body. As an alternative, attention could be given to the herbal infusions in the form of beverages, which is tisane. This review aims to provide a comprehensive exploration of tisanes, encompassing their definitions, botanical origins, historical background, types, preparation methods and possiblehealth/therapeutic properties. While tea as a beverage made from *Camellia sinensis* leaves continue as the most favored, the heightened attention in tisanes as a beverage in lieu of *Camellia sinensis*tea reflects an extensive mindset, cultural and habitual shift towards remedies based on naturally existing botanicals and holistic wellness. Additionally, since the nutritional composition of tisanes vary as according to the raw material utilized for decoction, a discussion is made based on the growing body of evidences on tisanes and their role in promoting human health and well-being which could potentially prove fruitful in the conceptualization for research and development in the preparation and studies on blends of tisanes and their benefits.

Keywords: Tea, Tisanes, Composition, no caffeine, health benefits

INTRODUCTION

A person's morning starts with a cup of tea. Tea as a beverage is second only to water in terms of consumption worldwide (Ajuwon*et al.*, 2018), and, in general, populace of societiesconsume and relish tea as a drink, mainly for refreshment in addition to its potential health benefits. Nevertheless,a serious consequential result arising out of drinking tea is the amount of caffeine present in it. Excess of caffeine consumption is detrimental to the well-being of any individual and may result in toxicity, cardiovascular diseases, osteoporosis, etc., to name a few (Nawrot *et al*., 2003). So, it shifted the world's focus into having a tea that's rejuvenating, healthy and without caffeine, which led to the discovery of herbal tea,

ISSN PRINT 2319 1775 Online 2320 7876

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technically known as tisanes.What is termed as "Tisane" is any tea that is not procured from the cured leaves of the tea plant, i.e., *Camellia sinensis* (Chen *et al.*, 2015). The tisane can be prepared from any other plant or its parts of plants such as leaves, flowers, fruits, seeds, and/or roots, so, technically, it is not a true tea. The word tisane is believed tostemfrom the Greek word ptisane which means a medicinal or curative beverage prepared from soaking barley in water, on one hand, and on the other, there is another belief for the word tisane to be of French origin meaning tea (ti) and without (sane). Therefore, according to the French, it is 'tea without tea' (Maiden, 2018).

HISTORY OF TISANES

The consumption of the botanical treasures of herbal infusions, called as tisanes, areoften steeped in cultural heritage and traditions specific to different regions worldwide, and has a rich history deeply intertwined with human civilization. From ancient herbalists to modern wellness enthusiasts, the practice of brewing and imbibing these aromatic concoctions has endured for centuries. While the exact origin of tisanes remains shrouded in shadows, and not much detailing has been recorded in documents, according to a Chinese legend, a story of a man called Shennong, acknowledged to the Chinese as 'the divine farmer', was known to discover the flavor of some herbs from a nearby tea which flew into his pot of boiling water (Benn, 2015). The infusion of the herbs into the water made the water taste delicious which may be the one of the early records for the usage of herbal decoctions as a beverage. Early records on tisanes were also found in a medical book written by a Chinese surgeon and physician Hua T'o, who created some anesthetics and herbal medicines by decocting some medicinal plants (Maiden, 2018).

The chronicles of Egyptian history also had some referral to tisanes in the Ebers Papyrus, wherein, usage of chamomile to revere their divine creator, healing of the ill and mummification of the deceased were recorded (Maiden, 2018). The herbs like basil and dill were blended with the herbal teas for better digestion and treatment of heart problems. However, it was not before 1070 BC, that tisanes established itself as a standard beverage (Maiden, 2018).

At a later record of 16th century, Portugese merchants were known to introduce the knowledge from China for the use of herbal infusions called as tisanes to the Western world. Then, by the 17th century, the Britishers introduced tisanes to the Indian and the American populations, and presently it is getting prominently accepted and popular in the tea markets and also has a potential for utilization as an alternate to expensive medicines (Maiden, 2018).

In contrast to this, the population in India has been consuming an alternate herbal infusion as a medicine named*'kadha'* since time immemorialwhich is a tisane in its form and usage, but,*kadha's* identity as tisanes was known much later (Naithani and Kakkar, 2005).

ISSN PRINT 2319 1775 Online 2320 7876

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TYPES OF TISANES

Tisanes can be produced from any edible part of the plant. These parts can be the bark, flower, fruit, leaf, root, seed etc. (Naithani and Kakkar, 2005). A list of different types of tisanes along with their botanical ingredients in form of parts used and references are given in Table 1.

Table 1: Table representing the plant parts used as tisanes with examples

Plant part used in tisane	Examples	Source
Bark	Black cherry bark (*Prunus serotina*), cinnamon (*Cinnamomum verum, Cinnamomum zeylanicum*), slippery elm (*Ulmus rubra*)	Naithani and Kakkar (2005)
Flower	Chamomile (*Matricariachamomilla, Matricaria recutita*), Hibiscus (*Hibiscus sabdariffa*), lavender (*Lavandula angustifolia*), rose (*Rosa damascena*), Linden (*Tilia platyphyllos, Tilia cordata*)	Naithani and Kakkar (2005); Vinokur (2006); Srivastava *et al*. (2010); Herrera-Arellano*et al.* (2007); Wissam *et al.* (2017)
Fruit	Apple (*Malus domestica*), blueberry (*Vaccinium corymbosum*), peach (*Prunus persica*) and raspberry (*Rubus idaeus*)	Naithani and Kakkar (2005)
Leaf	French verbena (*Verbena officinalis*), lemon balm (*Melissa officinalis*), lemon grass (*Cymbopogon citratus*), mint (*Mentha piperita*), Rooibos (*Aspalathus linearis*)	Kennedy *et al.* (2004);Naithani and Kakkar (2005);McKay and Blumberg (2006). Joubert*et al.* (2008)
Root	Chicory (*Cichorium intybus*), echinacea (*Echinacea purpurea/Echinacea angustifolia*), ginger (*Zingiber officinale*)	Naithani and Kakkar (2005); Schapowal*et al.* (2015); Ali *et al*. (2008)

ISSN PRINT 2319 1775 Online 2320 7876

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Seed	Caraway (*Carum carvi*), cardamom (*Elettaria cardamomum*), fennel (*Foeniculum vulgare*)	Naithani and Kakkar (2005); Malhotra (2006)

Tisanes may be produced from a mixture of different parts of plant or from different parts of the same plant(Pohl *et al.*, 2016). These ingredients going in to the process preparation are varied and are valued for their qualities pertaining to aroma, flavor and medicinal properties, which lead to their usage for promotion of health and well-being and may be blended with various ingredients to tailor it to individual health needs.

PREPARATION OF TISANES

Tisanes can be prepared either by decoction or by infusion(Goodwin, 2019), which are the main processes employed for bringing out the flavor and aroma of the botanical ingredients into the water. Besides these two main methods, other processes which may be mentioned are cold brew method (Damiani *et al.*, 2019) and preparation by solar infusion (Safdar *et al.* 2016).

Infusion Method: This process is also known as steeping. In this process, boiling water is poured on the plant matter. Plant parts like flower, leaf and seeds are usually used for infusions(Safdar *et al.* 2016;Goodwin, 2019). Infusion can be soft infusion (in water at 75-85℃ for few minutes), hard infusion (water ate temperature 75-85℃ for approximately half an hour), ambient infusion (water at 25℃ temperature for around 40 minutes), and cold infusion (using water of room temperature for around 15 minutes and followed by refrigeration for an hour) (Safdar *et al.* 2016).

Decoction method: In this method, the botanical ingredients are placed in boiling water. The attempt is to help in the release of flavor and essential oils. Hard plant parts like bark, berry, and root are used in decoction(Goodwin, 2019).

Cold Brew Method: Cold brewing method uses the process of botanical ingredients being infused at room temperature, following which refrigeration is carried out for an extended period (approximately 6-12 hrs) to bring out the flavor of the plant in the decoction (Damiani *et al.*, 2019). The difference between cold brew and cold infusion method is the duration for which the ingredients are refrigerated to bring out the flavor.

Solar Infusion Method (Sun Tea): - The plant parts are submerged in water in a container, sealed with cover and placed in direct sunlight for 3-4 hours, allowing the sun's heat to infuse the flavors into the water(Safdar *et al.* 2016).

The quantity of plant parts utilized for preparation of tisanes and the time duration needed for brewing may differ from tisane to tisane. The minimum time may be two minutes and may reach a maximum of fifteen minutes; while the quantity may vary from a pinch to several teaspoons(Goodwin, 2019).

ISSN PRINT 2319 1775 Online 2320 7876

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EFFECT OF TISANES ON HUMAN HEALTH

Tisanes are mostly composed of plant components, and these plant components are chosen from those purported to havebeneficial impact on human health and is refreshing as well. As such, when the plant parts are brewed or decocted, the integral components of the plant will get infused into the tisanes, thereby offering therapeutic benefit to the ones consuming it, and thus, helping in the process of alleviation of ailments.Most of the constituents gets extracted within an approximation of three minutes of brewing or decoction. Prolongation of brewing or decoction time may not give more significant results (Pohl *et al.,* 2016).The possible effects of some herbal teas on human health and well-being is elaborated in Table 2.

Table 2: Possible health benefits from tisanes

Tisanes	Possible health benefits
Basil (*Ocimumbasilicum*)	It has anti-inflammatory properties, helps in digestion, helps to fight against free radicals and depression, improves functioning of liver and gut (Correia *et al.*, 2018)
Blackberry (*Rubus fruticose*)	Fights against diarrhoea, dysentery, relieves labor pain, anti-oxidant, treats scurvy etc. (Rasheed*et al.*, 2017)
Cardamom (*Elettaria cardamomum*)	It acts as a breath freshener, fights cavities and improves digestion, traditionally used in the treatment ofbronchitis, dysentery, depression, dysentery, and influenza (Singletary, 2022)
Chamomile (*Matricaria recutita*)	It has an anti-oxidant, anti-microbial and anti-inflammatory action, lowers cholesterol and has anxiolytic and antispasmoticeffects.(McKay and Blumberg, 2006)
Cloves (*Syzygium aromaticum*)	anti-microbial properties (Mehrotra*et al.*, 2010);antiplaque and antigingivitis effects (Kothiwale *et al.*, 2014)
Cinnamon (*Cinnamomum zeylanicum*)	Helps in relieving dyslipidemia, hyperglycemia and polycystic ovary syndrome(Singletary, 2019).
Ginger (*Zingiber officinale*)	Used in treatment of arthritis, asthma, stomach upsetand menstrual irregularities, relieves nausea, also acts as an anti-oxidant and has anti-inflammatory properties (Singletary, 2010).
Hibiscus (*Hibiscus sabdariffa*)	It supports the immune system, helpful in

ISSN PRINT 2319 1775 Online 2320 7876

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	hypertension, improves digestion (McKay *et al.*, 2010)
Lemongrass (*Cymbopogon citratus*)	Anti-bacterial, Antihypertensive,Anti-inflammatory, Anti-obesity, Anti-oxidantantinociceptive, and anxiolytic (Olorunnisola*et al.*, 2014)
Mint (*Mentha spicata*)	Helps in the treatment of skin problems likeacne, itching, inflammation, and burns. Also helpful for gastrointestinal problemsand indigestion (Kizhedath and Suneetha,2011).
Honeybush (*Cyclopia vent.)*	Management of Type 2 Diabetes Mellitus (Ajuwon*et al.*, 2018)
Rooibos (*Aspalathus linearis)*	Management of Type 2 Diabetes Mellitus(Ajuwon*et al.*, 2018)

ANALYSIS OF TISANES

Analysing the compositional studies of tisanes could contribute to understanding diversity in the constituents found in tisanes and their phytochemical properties, highlighting their potential as functional beverages in promoting human health and well-being. The methodologies which can be employed to undertake these studies can be compiled to give an outline of the potential for further development in research in this field.

Phenolic compounds, total flavonoids and antioxidant activities of *Aldama helianthoides, Aloysia tarapacana, Azorella compacta, Baccharis alnifolia, Baccharis tola, Clinopodium gilliesii, Dunalia spinosa, Parastrephia lucida*, and *Polylepis tarapacana* from northern Chile: Trevizan*et al.* (2020) reported these components from tisane of these nine plants using FRAP, ORAC assay and ABTS.

Total phenolic compounds (TPC) and total flavonoids (TF) contents and the antioxidant capacity (DPPH and β-carotene/linoleic acid system) of nine herb infusions from the Amazonian region: The work published in the Journal Food Research International by da Silva Port's (2013) utilized high performance liquid chromatography (HPLC) coupled to a diode array detector (DAD) for study of tisane from *Chrysobalanusicaco, Luehea speciosa, Cymbopogon citratus, Lippia alba, Annona muricata* L., *Libidibia ferrea, Bauhinia ungulate, Fridericia chica* and *Croton* spp.

Nutraceutical Properties of Herbal Infusions from Six Native Plants of Argentine Patagonia: This study published in Plant Foods for Human Nutrition by Gastaldi *et al*. (2018) studied the antioxidant activity (DPPH assay), Total Phenolics (Folin–Ciocalteu colorimetric method and liquid chromatography with diode array detector and tandem mass spectrometry - LC-DAD-MS) and Flavonoid Content (spectrophotometry using aluminum trichloride). The

ISSN PRINT 2319 1775 Online 2320 7876

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plants utilized for tisane were *Adesmiaboronioides, Apium australe, Buddlejaglobosa, Drimys andina, Dysphaniamultifida*. and *Solidago chilensis.*

Herbal tea infusions of plants [*Erica australis* (flowering tips), *Genista tridentata*(flowers), *Melissa officinalis* (leaves), *Mentha spicata* (inflorescences), and *Prunella vulgaris*(leaves)]and their mixtures withbioactive properties were profiled in Food and Function Journal by Calej*aet al.* (2019) for their nutritional composition using AOAC (Association of Official Analytical Collaboration) methods and High performance liquid chromatography (HPLC) techniques coupled to a refractive index detector while phenolic compounds were identified with diode-array detector linked to anelectrospray ionization mass spectrometry working in negative mode. They also chalked out the antioxidant activity using thiobarbituric acid reactive substances(TBARS).

A number of investigations have been carried out to study the composition of herbal tea worldwide, especially for phenolic compounds, flavonoids, antioxidant capacity, etc.In recent technological trends of analysis, Pohl *et al.*, 2016 stated that spectrometric methods like electrothermal atomic absorption spectrometry (ETAAS), flame atomic absorption spectrometry (FAAS),inductively coupled plasma mass spectrometry (ICP-MS) and inductively coupled plasma optical emission spectrometry (ICP-OES) could be used to determine the constituents present in the tisanes.

DISCUSSION AND CONCLUSION

Tisanes are composed of compounds having beneficial essential oils and polyphenols that have no or very little concentration of caffeine (Duband*et al.*, 1992).As stated by USDA, tisanes in general, are also rich in Vitamin C and Iron, which enhances the immunity power of humans. It can be used as a substitute for tea, and is infact more beneficial than tea due to the absence of caffeine. However, the composition of the tisane may vary from the raw material from which it is produced. It was studied byDuband*et al.*, 1992 that tisanes of peppermint retained 21% of the essential oils from the original peppermint leaves.

The compositional and validation of health and wellness from consumption of tisanes prepared from local herbs, spices, condiments, fruits and other plant parts as per traditional knowledge of various regions worldwide could provide insights into the pros and cons of consumption of these tea from herbs, which is without caffeine, and could highlight the rich botanical heritage and potential health benefits of traditional herbal infusions.

This review compiles a list of the different methods which is utilized in the preparation of tisanes, which offer flexibility in preparation of tisanes according to personal preferences and desired flavors, a process of mix-and-match.There is a need for documentation of varied additional methods which offer alternative ways to prepare tisanes, each resulting in unique flavor profiles and aroma characteristics.Further, the plant from which the tisane is made may carry some harmful pollutants or metals, considering the environment in which the plant was grown. These plants may also pass on the harmful pollutants to the tisanes, which could lead to adverse situations of the consumer, if not studied properly. Moreover, proper guidelines for the consumption dose of tisaneshave to be documented and researched properly, as not many

ISSN PRINT 2319 1775 Online 2320 7876

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substantial research is available on these details (Pohl *et al.*, 2016). Therefore, there can be a recommendation for study on the composition and dosage of tisanes to carry forward it's potential to promote it as a safe and healthy drink.By synthesizing existing research, and formulating new methods of preparation, correct time duration for infusions, allowed correct dosage of amount of plant parts which could be safe and healthy for preparation of tisane, advancing into their analysis for their constituents could contribute to a better understanding of the tisanes and their role in promoting human health and well-being.

REFERENCES

Ajuwon, O. R., Ayeleso, A. O., &Adefolaju, G. A. (2018). The potential of South African herbal tisanes, rooibos and honeybush in the management of type 2 diabetes mellitus. *Molecules*, *23*(12), 3207.

Ali, B.H., Blunden, G., Tanira, M.O., Nemmar, A. (2008). Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): A review of recent research. *Food and Chemical Toxicology*, 46(2), 409–420.

Benn, J.A. (2015). Tea in China:A Religious and Cultural History, Hong Kong University Press,288 pp. ISBN 978-988-82-0873-9

Caleja,C. ,Finimundy,T.Pereira,C., Barros,L.,Calhelha,R. C.,Sokovic,M.,Smiljkovic, M., Carvalho,A. M., Rosa, E., & Ferreira,I.C.F.R. (2019).Challenges of traditional herbal teas: plant infusions and their mixtures withbioactive properties,*Food Function*, 10(9), 5939-5951. DOI: 10.1039/C9FO01473J.

Chen, G.L., Chen, S.G., Xie, Y.Q.,Chen, F., Zhao,Y.Y., LuoC.X. & Gao,Y.Q. (2015). Totalphenolic, flavonoid and antioxidantactivity of 23 edible flowers subjectedto in vitro digestion. *Journal of Functional Foods*, 17, 243–259.

Correia, A. M., Pedrazzani, A. S., Mendonça, R. C., Massucatto, A., Ozório, R. A., & Tsuzuki, M. Y. (2018). Basil, tea tree and clove essential oils as analgesics and anaesthetics in Amphiprionclarkii (Bennett, 1830). Brazilian Journal of Biology, 78(3), 436-442.

Damiani E, Carloni P, Rocchetti G, Senizza B, Tiano L, Joubert E, de Beer D, & Lucini L. (2019). Impact of Cold versus Hot Brewing on the Phenolic Profile and Antioxidant Capacity of Rooibos (*Aspalathus linearis*) Herbal Tea. *Antioxidants*. 8(10):499. https://doi.org/10.3390/antiox8100499

da Silva Port's, P., Chisté, R.C., Godoy, H.T., & Prado, M.A. (2013). The phenolic compounds and the antioxidant potential of infusion of herbs from the Brazilian Amazonian region, *Food Research International*, 53(2), 875-881.

Duband, F., Carnat, A. P., Carnat, A., Petitjean-Freytet, C., Clair, G., & Lamaison, J. L. (1992, January). Aromatic and polyphenolic composition of infused peppermint, Mentha x piperita L. In Annales pharmaceutiquesfrancaises (Vol. 50, No. 3, pp. 146-155).

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved,** **UGC CARE Listed (Group -I) Journal Volume 10, Iss 12, 2021**

Gastaldi, B., Marino, G., Assef, Y., Sofras, F.M.S., Catalan, C.A.N., & Gonzalez, S.B. (2018). Nutraceutical Properties of Herbal Infusions from Six Native Plantsof Argentine Patagonia, *Plant Foods for Human Nutrition*, 73, 180–188. https://doi.org/10.1007/s11130-018-0680-3

Goodwin, L. (2019, October 25). Are Herbal Teas (Tisanes) Really Tea? Retrieved August 10, 2020, from https://www.thespruceeats.com/tisane-herbal-infusion-basics-766322

Herrera-Arellano, A., Miranda-Sánchez, J., Avila-Castro, P., & Herrera-Alvarez, S. (2007). Clinical effects produced by a standardized herbal medicinal product of *Hibiscus sabdariffa* on patients with hypertension. A randomized, double-blind, lisinopril-controlled clinical trial. *Planta Medica*, 73(1), 6–12.

Joubert, E., Gelderblom, W.C.A., Louw, A., de Beer, D. (2008). South African herbal teas: *Aspalathus linearis*, *Cyclopia* spp. and *Athrixiaphylicoides*—A review. *Journal of Ethnopharmacology*, 119(3), 376–412.

Kennedy, D.O., Little, W., & Scholey, A.B. (2004). Attenuation of laboratory-induced stress in humans after acute administration of *Melissa officinalis* (Lemon Balm). *Psychosomatic Medicine*, 66(4), 607–613.

Kizhedath, A., & Suneetha, V. (2011). Estimation of chlorophyll content in common household medicinal leaves and their utilization to avail health benefits of chlorophyll. *Journal of Pharmacy Research*, *4*(5), 1412-1413.

Kothiwale, S. V., Patwardhan, V., Gandhi, M., Sohoni, R., & Kumar, A. (2014). A comparative study of antiplaque and antigingivitis effects of herbal mouthrinse containing tea tree oil, clove, and basil with commercially available essential oil mouthrinse. *Journal of Indian Society of Periodontology*, *18*(3), 316.

Maiden, Z. (2018, June 22). Benefits of Tisane. Retrieved August 10, 2020, from https://www.hackberrytea.com/blogs/tea-education/the-benefits-of-tisane

Malhotra, S.K. (2006). 15 – Caraway, In: Handbook of Herbs and Spices, Volume 3, Woodhead Publishing Series in Food Science, Technology and Nutrition, Pages 270-298

McKay, D. L., & Blumberg, J. B. (2006). A review of the bioactivity and potential health benefits of chamomile tea (Matricaria recutita L.). *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives*, *20*(7), 519-530.

McKay, D. L., Chen, C. O., Saltzman, E., & Blumberg, J. B. (2010). Hibiscus sabdariffa L. tea (tisane) lowers blood pressure in prehypertensive and mildly hypertensive adults. The Journal of nutrition, 140(2), 298-303.

McKay, D.L., & Blumberg, J.B. (2006). A review of the bioactivity and potential health benefits of peppermint tea (*Mentha piperita* L.). *Phytotherapy Research*, 20(8), 619–633.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved,** **UGC CARE Listed (Group -I) Journal Volume 10, Iss 12, 2021**

Mehrotra, S., & Srivastava, A. K. (2010). Comparative antimicrobial activities of Neem, Amla, Aloe, Assam Tea and Clove extracts against Vibrio cholerae, Staphylococcus aureus and Pseudomonas aeruginosa. *Journal of Medicinal Plants Research*, *4*(22), 2393-2398.

Naithani, V., & Kakkar, P. (2006). Effect of ecological variation on heavy metal content of some medicinal plants used as herbal tea ingredients in India. *Bulletin of Environmental Contamination & Toxicology*, *76*(2).

Nawrot, P., Jordan, S., Eastwood, J., Rotstein, J., Hugenholtz, A., & Feeley, M. (2003). Effects of caffeine on human health. Food Additives & Contaminants, 20(1), 1-30.

Olorunnisola, S. K., Asiyanbi, H. T., Hammed, A. M., & Simsek, S. (2014). Biological properties of lemongrass: An overview. *International Food Research Journal*, *21*(2), 455.

Pohl, P., Dzimitrowicz, A., Jedryczko, D., Szymczycha-Madeja, A., Welna, M., & Jamroz, P. (2016). The determination of elements in herbal teas and medicinal plant formulations and their tisanes. *Journal of Pharmaceutical and Biomedical Analysis*, *130*, 326-335.

Rasheed, H. U., Nawaz, H., Rehman, R., Mushtaq, A., & Rashid, U. Blackberry(2017): A review on its composition and chemistry, uses and bioavailability and potential health benefits.International Journal of Chemical and Biochemical Sciences, 11, 120-128.

Schapowal, A., Klein, P., & Johnston, S.L. (2015). Echinacea reduces the risk of recurrent respiratory tract infections and complications: A meta-analysis of randomized controlled trials. *Advances in Therapy*, 32(3), 187–200.

Singletary, K. (2010). Ginger: an overview of health benefits. *Nutrition Today*, *45*(4), 171-183.

Singletary, K. (2019). Cinnamon: Update of potential health benefits. *Nutrition Today*, *54*(1), 42-52.

Singletary, K. (2022). Cardamom: Potential Health Benefits. *Nutrition Today*, *57*(1), 38-49.

Srivastava, J.K., Shankar, E., & Gupta, S. (2010). Chamomile: A herbal medicine of the past with a bright future. *Molecular Medicine Reports*, 3(6), 895–901.

Trevizan, J., Soto, E., Parra, F., Bustos, L., & Parra, C. (2020). Antioxidant activity of nine medicinal plants with commercial potential, *IDESIA (Chile)*, 38(3), 53-58

USDA (United States Department of Agriculture). (n.d.). Food Data Central. Retrieved October 25, 2021, from https://fdc.nal.usda.gov/

Vinokur, Y., Rodov, V., Reznick, N., Goldman, G., Horev, B., Umiel, N. & Friedman, H. (2006). Rose Petal Tea as an Antioxidant-rich Beverage: Cultivar Effects. *Journal of Food Science*, 71(1), S42-S47, https://doi.org/10.1111/j.1365-2621.2006.tb12404.x

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **© 2012 IJFANS. All Rights Reserved,** **UGC CARE Listed (Group -I) Journal Volume 10, Iss 12, 2021**

Wissam, Z., Nour, A.A., Bushra, J., Zein, N. & Saleh, D. (2017). Extracting and studying the antioxidant capacity of polyphenols in dry linden leaves (*Tilla cordata*). *Journal of Pharmacognosy and Phytochemistry*, 6(3), 258-262.