HEALTH BENEFITS OF VARIOUS INDIAN CULINARY HERBS AND COMPARATIVE STATISTICAL ANALYSIS FOR ORGANOLEPTIC PROPERTIES OF INDIAN TEAS BY USING ANALYSIS OF VARIANCE (ANOVA)

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ABSTRACT

Objective: To statistically evaluate and compare the organoleptic properties of various Indian herbal teas (ginger, Tulsi, mint and cardamom).

Methods: The combination of various culinary herbs has been taken and formulated into drinks. The herbs chosen for the current study were Tulsi, ginger, mint, cardamom and other medicinally useful herbal families. The organoleptic properties of the herbal drinks were evaluated by sensory analysis and statistically compared using analysis of variance (ANOVA).

Results: Ginger mint tea was found to have the best overall rating and the best texture, color and other organoleptic properties, according to the data provided by the candidates of sensory analysis. Also, ginger mint tea has several health benefits which have been confirmed by the scientists. It can be used for the treatment of various digestive and cardiovascular diseases.

Conclusion: Owning to the above results, ginger mint tea can be used as a potent health and energy drink, as it does not have any side effect and provide several health benefits.

Keywords: Herbal drinks, Sensory analysis, ANOVA, tea, Ayurvedic, Organoleptic property.

INTRODUCTION

Herbal teas are often consumed for their physical or medicinal effects, especially for their sedative, relaxative, and stimulative properties. The medicinal benefits of specific herbs are often anecdotal, and in various countries makers of herbal teas are not allowed to make unsubstantiated claims about the medicinal effects of their products. Most herbal teas are safe for regular consumption, but some do have the allergenic or toxic effects. Herbal teas are mostly popular because of their fragrance, antioxidant properties and therapeutic applications. The antioxidant properties[1,2] of herbal teas from temperate plants of mainly Lamiaceae have been well-studied while those of tropical herbal teas are less well-studied.

Dried cloves are a key ingredient in Indian Masala tea, spiced tea, a special variation of tea popular in various regions of India. In Ayurvedic medicine it is considered to have the effect of increasing heat in system, hence the difference of usage by region and season[6]. Cloves are also said to be a natural antihelminthic[7]. Western studies have supported the use of cloves and clove oil for dental pain[9]. Clove reduces blood sugar levels[4]. Clove is used in traditional Chinese medicine to treat stomach issues, constipation, dysentery, and other digestion problems[8]. Stimulating to the digestion, pepper is seen primarily as a remedy for indigestion, bloating, gas and malabsorption[5]. Studies have shown that it not only increases the appetite and production of hydrochloric acid but improves digestion of many key nutrients such as the B vitamins, beta-carotene and selenium and various phytochemicals from other spices and green tea[3].

Ginger is good for the respiratory system[10]. It is good to fight against colds and flu[11]. Ginger offers substantial protection from stroke and heart attack because of its ability to prevent blood clotting[12]. Ginger, a multifaceted herb, is crucial in the battle against cardiovascular disease[13]. It relieves headaches, pains, and helps to clear sore throats[14]. It is very effective as a cleansing agent through the bowels and kidneys and also through the skin[15]. Mint is well known for its properties related to indigestion, stomach cramps, menstrual cramps, flatulence, upset stomach, nausea, and vomiting. Mint also can be used as an appetite stimulant[16]. It reduces hunger for a short time, but when the effects wear off the hunger returns stronger than before[17].

Tulsi is known to promote the longevity of life[18]. It is extensively brought to use for curing various diseases such as the common cold, inflammation, malaria, heart disease, headaches, stomach disorders, kidney stones, heart disorders, and many more[19]. Tulsi leaves are widely used due to their healing power. It is a tonic for the nervous system and thus, helps a great deal in sharpening the memory[20]. This aromatic plant supports the removal of phlegm and catarrhal matter from the bronchial tube[21]. It also works wonders in preventing stomach disorders. Tulsi has the ability to strengthen the kidneys functioning. For those suffering from the problem of renal kidney stones, the decoction prepared by mixing the juice of Tulsi leaves with honey, if taken sincerely for six consecutive months can oust these stones via the urinary tract. For maintaining healthy heart, Tulsi is of utmost value. It helps in lowering the level of cholesterol in blood. Thus, Tulsi plant serves as the most effective remedy to combat cardiac diseases and several renal malfunctions.

In the current research, the effort is to investigate the health effects of various Indian culinary herbs and choose the best herbs combination to prepare the herbal drink having several health effects. The combination of Ginger, Tulsi, Cardamom, Mint, Cloves, and other Indian herbs have been chosen upon the literature survey and further the organoleptic property have been evaluated by sensory analysis.

MATERIALS AND METHOD

Sample Collection

Green tea, Ginger, Tulsi, Cloves, Black pepper, Bay leaves, Honey, Cardamom, Mint leaves, Cinnamon powder, and milk were purchased from VIT Shopping complex.

Masala tea preparation

100ml of drinking water was taken. 1gm each of Elettaria cardamomum (Cardamom), Piper nigrum (peppercorn), Syzygium aromaticum (Cloves), and Laurus nobilis (bay leaves) was added and the content was boiled for 5 minutes at 100°C. 50ml of milk was added to the mixture. Further, 5gm of green tea and 10gm of honey was added to the mixture and was again boiled at 100°C for 3 minutes. The solution was served hot for sensory analysis of organoleptic properties.
Ginger Mint tea preparation

100 ml of drinking water was taken. 1 gm each of freshly chopped Zingiber officinale (ginger), 5 gm of Mentha spicata (Mint) leaves was added and the mixture was boiled for 5 minutes at 100°C. 5 gm of Camellia sinensis (green tea) and 10 gm of honey was added to the mixture and heated for 5 minutes at 100°C. The hot sample was served hot for sensory analysis of organoleptic properties.

Tulsi tea preparation

100 ml of drinking water was taken. 10 gm each of Ocimum tenuiflorum (Tulsi) leaves, 2 gm of Elettaria cardamomum (cardamom), 2 gm of Syzygium aromaticum (cloves), and 1 gm of Zingiber officinale (ginger) powder was added. The mixture was boiled for 5 minutes at 100°C. 5 gm of Camellia sinensis (green tea) and 10 gm of honey was added to the mixture and heated for 5 minutes at 100°C. The hot sample was served for sensory analysis of organoleptic properties.

Sensory analysis

Organoleptic properties taken into consideration of the current study are Flavour, Texture, Colour, and Taste. 50 candidates aged between 18 to 24 years of age were selected voluntarily. There were 25 male and 25 female candidates. The sensory analysis was based on 5 point hedonic scale, "excellent" being the 1st point and "bad" being the 5th point. The number of points given by the candidates to each herbal drink were added up and plotted as graphical representation to further compare and choose the best drink with best health effects.

RESULTS AND DISCUSSIONS

Analysis of Variance (ANOVA) was performed for the flavour, taste and colour of three herbal drinks, namely, Masala tea, ginger mint tea and Tulsi tea. Table 1, Table 2 and Table 3 shows the ANOVA results. The null hypothesis is rejected for all of the three organoleptic properties, stating that there is no similarity between the organoleptic properties of Masala tea, ginger mint tea and Tulsi tea. Further, sensory analysis was performed by voluntarily choosing 50 candidates aged between 18 to 25 years, with equal number of male and female participants. The sensory analysis was performed on 5 point hedonic scale. The point 1 was kept for excellent and point 5 was kept for bad organoleptic property. The points were added up and plotted as graphical representation. Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, shows the graphical representation of the sensory analysis of herbal drinks. It can be concluded from the graph that ginger mint tea has excellent color and excellent texture. The Masala tea has the excellent flavour and excellent taste. The maximum overall rating for best organoleptic property by the candidates was given to ginger mint tea followed by Masala tea. Though Tulsi leaves have several health effects but the organoleptic properties are not preferred by consumers. Thus, ginger mint tea and Masala tea can be used as the herbal drink with potent antioxidant, anticarcinogenic and several other health benefits. Further, the Tulsi leaf dosages can be adjusted to formulate the herbal drink with best organoleptic property.

Table 1: It shows ANOVA for flavour: Null hypothesis is rejected. There is no similarity between the flavour of Masala tea, ginger mint tea and Tulsi tea.

<table>
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<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<td>Between Groups</td>
<td>31.308</td>
<td>5</td>
<td>6.262</td>
<td>13.524</td>
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<td>.463</td>
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<td>Total</td>
<td>51.680</td>
<td>49</td>
<td></td>
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<tr>
<td>Flavour of ginger mint tea</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Between Groups</td>
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<td>5</td>
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<tr>
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<td>Total</td>
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</table>
Fig. 1: Sensory analysis for Color of herbal drinks (Note: X-Axis shows the frequency of rating for various organoleptic properties and Y-Axis shows the sample under study)

Fig. 2: Sensory analysis for texture of herbal drinks (Note: X-Axis shows the frequency of rating for various organoleptic properties and Y-Axis shows the sample under study)

Fig. 3: Sensory analysis for flavour of herbal drinks (Note: X-Axis shows the frequency of rating for various organoleptic properties and Y-Axis shows the sample under study)
CONCLUSION
The current study concludes to the fact that ginger mint tea has overall excellent rating and it is most preferred by the candidates. The organoleptic properties of the ginger mint tea has been preferred the most followed by Masala tea. Further, there is a need of optimisation of various organoleptic properties of ginger mint tea and Masala tea to make it more consumer health effective. Tulsi tea has not been preferred by the candidates but it has several health effects as evident from the literature survey. Thus, there is a need for optimisation of Tulsi leaves dosage and preparation of a Tulsi tea which can be more preferred by the consumers.

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