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Research Article

SENSORY EVALUATION OF TEA FORMULATED BY UTILIZING FRUIT PEELS & SPICES

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ABSTRACT

Tea is at present the most widely consumed beverage in the world and therefore ranks as an important world Food product. Some of the chemical constituents of tea contributing to the quality attributes along with others are strong antioxidants. Antioxidants are substances that, at low concentrations, put off or retard the oxidation of easily oxidisable bio molecules such as lipids, proteins and DNA. The waste materials such as the peels and pomace are a source of sugars, minerals and organic acids, dietary fibers and phenolics which have a wide range of actions which includes antioxidants, antimutagenic, cardio preventive, antibacterial and antiviral activities. Pomegranate peels yield more of the powerful antioxidants such as flavonoids, phenolics, and proanthocyanidins than what the pulp yields. Even the tests performed to test antioxidant activity showed that the peels of the pomegranate fruit had higher activity levels than the pulp. These findings are interesting in that the antioxidant activity in the peels was more successful in protecting LDL cholesterol against oxidation. Cinnamon is mostly used in the aroma and essence industries due to its fragrance, which can be integrated into varieties of food stuffs, perfumes, and medicinal products. Cinnamon has several health benefits such as anti-inflammatory, antitermitic, nematocidal, mosquito larvicidal (Cheng SS. *et al* (2004), insecticidal, antimycotic and anticancer agent. Lemon peels contain about 5 to 10 times more vitamins than lemon juice they contain high amounts of calcium and vitamin C, lemon peels have been shown to aid preventing osteoporosis, inflammatory polyarthritis, and rheumatoid arthritis. Five treatments were developed using different waste product such as pomegranate peel, lemon rind powder, cinnamon i.e- T1-15 gms of sp(sugar powder) with addition of 5gms of ppp(pomegranate peel powder), 1.25gms of cp(cinnamon powder) and 1.25 gms of tp(tea powder), 0.25gms of lrp(lemon rind powder). T2- 20gms of sp with the incorporation of 15gms of ppp, 1.66gms of cp and 1.25gms of tp, 0.25gms of lrp. T3- 25gms of sp with the addition of 10gms of ppp, 2.5gms of cp, 1.25gms of tp, 0.25gms of lrp. T4-10gms of sp with the mixing of 2.5gms of ppp, 1.66gms of cp & 1.66gms of tp, 0.25gms of lrp. T5- 15 gms of sc (sugar crystal) with addition of 5gms of ppp, 1.25gms of cp, 1.25gms of tp, 0.25gms of lrp. These five treatment was evaluated by sensory evaluation. Sensory evaluation was carried out using 9 point hedonic scale, out of the five treatments, best acceptable product was T3 with highest average (41) & with least SD (0.81).

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INTRODUCTION

By description, tea is an infusion of the leaves or other parts of the evergreen tea plant (*Camellia* sp). Teas have been traditionally characterized into green, oolong and black teas according to the processing conditions employed during manufacturing (Kirk and Sawyer (1997). Some of the chemical constituents of tea contributing to the quality attributes along with others are strong antioxidants. Antioxidants are substances that, at low concentrations, put off or retard the oxidation of easily oxidisable bio molecules such as lipids, proteins and DNA. Antioxidants chiefly define as substances which counteract free radicals, thus preventing oxidative damage.

Residues from processing of vegetables and fruits, traditionally considered as an environmental problem, are being increasingly acknowledge as sources for obtaining valuable products. Use of waste as a source of polyphenols and antioxidants may have substantial economic benefit to food processors. (Soma Singh. *et al* (2014). by-products are potential sources of both antioxidant and nutraceutical components that can be explored. (A. Padmaja. *et al* (2011). Pomegranate peels yield more of the powerful antioxidants such as flavonoids, phenolics, and proanthocyanidins than what the pulp yields. Even the tests performed to test antioxidant activity showed that the peels of the pomegranate fruit had higher activity levels than the pulp. These findings are interesting in that the antioxidant activity in

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the peels was more successful in protecting LDL cholesterol against oxidation. Cinnamon is mostly used in the aroma and essence industries due to its fragrance, which can be integrated into varieties of food stuffs, perfumes, and medicinal products [Huang TC (2007)]. Cinnamon involves a variety of beneficial many compounds, including cinnamaldehyde, cinnamate, cinnamic acid, and essential oil (Senanayake UM (1987)). Cinnamon has several health benefits such as anti-inflammatory, antitermitic, nematicidal (Park IK. et al (2005), Kong JO. et al (2007), mosquito larvicidal (Cheng SS. et al (2004), insecticidal, antimycotic and anticancer agent. Lemon peels contain about 5 to 10 times more vitamins than lemon juice they contain high amounts of calcium and vitamin C, lemon peels have been shown to aid preventing osteoporosis, inflammatory polyarthritis, and rheumatoid arthritis. The significant result of the present study was concluded with the prime objective of the research work i.e utilization of waste product for developing antioxidant rich tea. This study also revealed that inspite of the fact that fruit peels are thrown away, they can be used as a very good source of antioxidant rich product in our day to day life. Thus fully utilizing the benefit of the complete fruit.

Objective

To characterised the different treatment of developed tea by utilizing fruit peels & spices using sensory evaluation method.

MATERIAL AND METHODS

Organoleptic evaluation of product developed

Organoleptic evaluation is a scientific discipline that analyses and measures human responses to the composition of food and drink, e.g. appearance, touch, odour, texture, temperature and taste. This discipline requires panel of human assessors by whom the products are tested, and responses are recorded by them. The different treatments of tea were developed by using fruit peels such as pomegranate peel, lemon rind & cinnamon & put forward for the sensory evaluation for identifying the best acceptable product. Codes T1, T2, T3,T4,T5 were allotted to different treatment developed respectively. Then a 9 point hedonic scale was prepared. The most widely used hedonic scale is a nine-point scale, in which the person rates their preference for food, ranging from "extremely dislike" to "extremely likel. Differently coded samples were presented to panel members one at a time and they were asked to rate their hedonic response on the scale. At the end of this phase marking of individual products were calculated and the best acceptable product was determined.

RESULT AND DISCUSSION

Characterisation of developed product on various parameters

The experimental tea were characterised as developed product in the present study. For that sensory evaluation process was done by set of panellist constitute 5 members in the expertise field of nutrition. For evaluating, a 9-point hedonic scale which is one of the sensory evaluation method used to evaluate any product. Four parameters were used to analyse the acceptability of developed product these are as below-

- Body and Texture
- Color and Appearance

- Flavor and Taste
- Overall Acceptability

The total average and standard deviation of individual product was calculated and the best of the five treatment was found. Individual markings from each of the panel members for different parameters have been mentioned below.

Parameter 1 Flavour & taste

Table 1 Individual Markings For Flavour And Taste

	T1	T2	T3	T4	T5
Member 1	1	4	9	6	8
Member 2	3	5	7	8	6
Member 3	7	5	7	5	5
Member 4	7	8	9	8	7
Member 5	7	6	8	6	6
Total	25	28	40	33	32

Where

T1-15 gms of sp (sugar powder) + 5gms of ppp(pomegranate peel powder) +1.25gms cp(cinnamon powder) + 1.25 gms tp(tea powder) +, 0.25gms of lrp(lemon rind powder).

T2- 20gms of sp + 15gms ppp +1.66gms cp+ 1.25gms tp + 0.25gms of lrp.

T3- 25gms sp +10gms ppp + 2.5gms cp + 1.25gms tp+ 0.25gms of lrp.

T4-10gms sp+ 2.5gms ppp +1.66gms cp & 1.66gms tp + 0.25gms lrp.

T5- 15 gms sc + 5gms ppp + 1.25gms +1.25gms tp + 0.25gms lrp.

- The above mentioned table represent score of individual markings by members on the basis of flavour and taste the minimum average scored is 25 by T₁ while maximum is of T₃ with an average of 40, which shows the highest acceptability of sample T₃ in respect of flavour & taste.

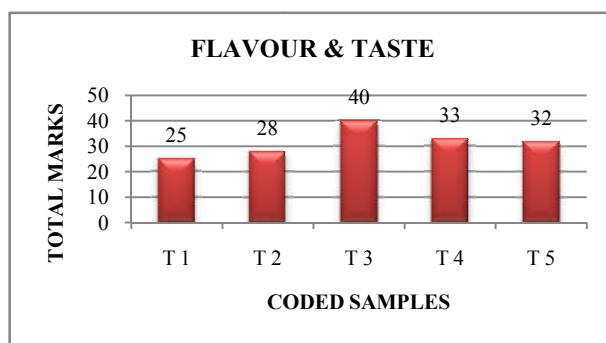


Fig1 Graphical Representation of Scores for Flavour And Taste

Parameter 2 Body and Texture

Table 2 Individual Markings For Body And Texture

	T1	T2	T3	T4	T5
Member 1	6	7	8	6	6
Member 2	2	8	9	4	2
Member 3	8	7	8	6	4
Member 4	7	8	9	7	6
Member 5	7	6	8	6	6
Total	30	36	42	29	24

- The above mentioned table represent score of individual markings by 5 panellist members on the basis of body & texture the minimum average scored is

24 by T₅ while maximum is of T₃ with an average of 42, which shows the highest acceptability of sample T₃ in respect of body & texture.

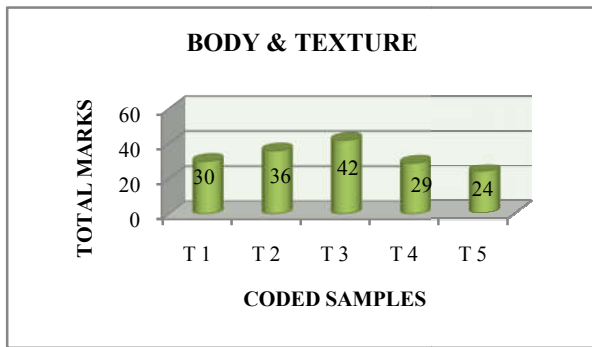


Fig 2 Graphical Representation of Scores for Body and Texture

- The above graph represents the scores for body and texture of the product where T₃ has average of 42 marks while T₅ scores the least, each product presented an individual texture according to the coded samples.

Parameter 3. Colour and Appearance

Table 3 Individual Markings For Colour And Appearance

	T ₁	T ₂	T ₃	T ₄	T ₅
Member 1	4	7	8	6	6
Member 2	4	7	8	7	5
Member 3	7	6	8	5	4
Member 4	3	8	9	6	6
Member 5	6	6	8	7	5
Total	24	34	41	31	26

- The above drawn table represent score of individual markings by 5 panellist members & their average marks on the basis of colour & appearance the minimum average scored is 24 by T₁ while maximum is of T₃ with an average of 41, which shows the highest acceptability of sample T₃ in respect of colour & appearance.

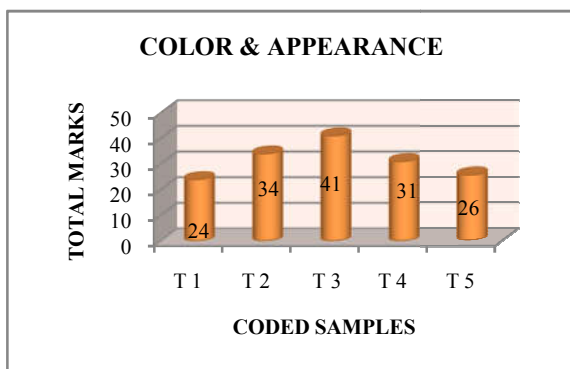


Fig 3 Graphical Representation of Scores for Colour and Appearance

Parameter 4 Overall Acceptability

Table 4 Individual Markings for Overall Acceptability

	T ₁	T ₂	T ₃	T ₄	T ₅
Member 1	6	7	8	6	6
Member 2	4	5	8	7	8
Member 3	7	5	8	6	5
Member 4	6	8	9	7	6
Member 5	7	6	8	6	5
Total	30	31	41	32	31

- The drawn table represent score of individual markings by panellist members & their average marks of overall acceptability, the minimum average scored is 30 by T₁ while maximum is of T₃ with an average of 41, which shows the highest acceptability of sample T₃ in respects of products overall acceptability

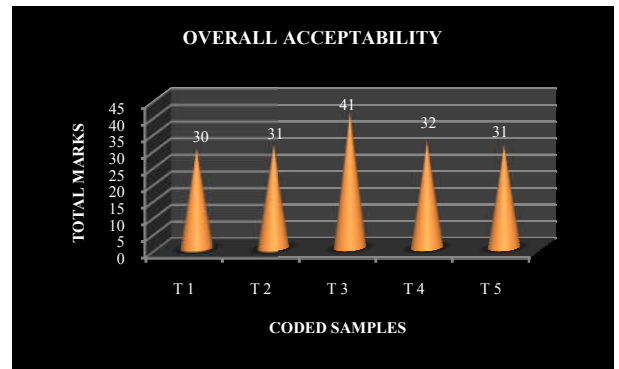


Fig 4- Graphical Representation of Scores for Overall Acceptability

Table 5 Overall Calculation

	T ₁	T ₂	T ₃	T ₄	T ₅
P ₁	25	28	40	33	32
P ₂	30	36	42	29	24
P ₃	24	34	41	31	26
P ₄	30	31	41	32	31
Overall sum	109	129	164	125	113
Average	27.25	32.25	41	31.25	28.25
S.D.	6.73	3.5	0.81	1.70	3.86

- The respective table which is drawn above shows the overall calculations of average marks given by each panellist in each parameters ,with calculated average values & S.D. of each sample on the basis of each parameters

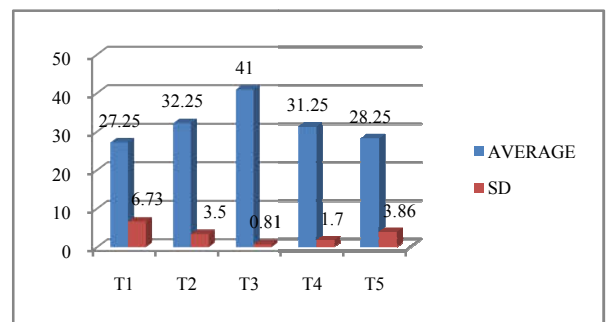


Fig 5 Graphical Representation of Average Score and Standard Deviation for Overall Calculation

Where - T₁, T₂, T₃, T₄, T₅ was coded samples prepared

P= Parameter (P₁= Flavor and Taste, P₂= Body and Texture, P₃= Color and Appearance and P₄= Overall Acceptability)

S.D.= Standard Deviation (SD reflex the fluctuation in the marks given by different Members and for different parameter)

- T₃ scored maximum with highest average and least SD which indicate its highest acceptability among the five prepared experimental samples.**

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