www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 1(1): 394-397

www.thepharmajournal.com
Received: 04-10-2021
Accepted: 08-11-2021

Sandeep Pahare
Department of Vegetable Science, Pt KLS College of Horticulture and Research Station, Indira Gandhi Agricultural University, Rajnandgaon, Chhattisgarh, India

Bhagwat Saran Asati
Department of Vegetable Science, College of Agriculture and Research Station, Indira Gandhi Agricultural University, Chhuikhadan, Rajnandgaon, Chhattisgarh, India

Shishir Prakash Sharma
Department of Vegetable Science, Pt KLS College of Horticulture and Research Station, Indira Gandhi Agricultural University, Rajnandgaon, Chhattisgarh, India

Correspondence author:
Bhagwat Saran Asati
Department of Vegetable Science, College of Agriculture and Research Station
Indira Gandhi Agricultural University, Chhuikhadan, Rajnandgaon, Chhattisgarh, India

Quality and sensory evaluation study of *Moringa oleifera* energy drink with pineapple flavour

Sandeep Pahare, Bhagwat Saran Asati and Shishir Prakash Sharma

Abstract
An experiment was conducted at Pt. KLS College of Horticulture and Research Station, Rajnandgaon, Raipur, Chhattisgarh in laboratory condition during 2020-21 to evaluate quality and sensory parameters of *Moringa oleifera* energy drink blended with pineapple. The experiment was laid out in Completely Randomized Design (CRD) with 03 replications and 08 treatments. Quality and sensory parameters were recorded for all the treatments under this study. The result showed that the quality and sensory evaluation observations *i.e.* color, appearance, taste, aroma and overall acceptability significantly found superior in the treatment T_1 (Moringa leaf extract: pineapple extract:: 10:90) and this treatment T_1 (10:90) can be chosen to produce the best quality moringa energy drink blended with pineapple.

Keywords: moringa, energy drink, sensory evaluation, overall acceptability

Introduction
Drumstick (*Moringa oleifera* Lam.) is one of the important perennials grown in the state of Chhattisgarh. It is popular because of its unique flavor and attractive taste. Drumstick leaves are better than flowers, stems, pods and roots and are the most nutritious leaves in the world. The leaves of this plant have been reported to having highest amount of essentially amino acid with the right balance, as well as high amount of minerals and vitamins (Fuglie, 2009) [7]. Pineapple fruit most popular tropical fruit that are well known for its juice and sweet tasty. This fruit is richest in nutrition and contain highest amount of vitamin, fibers, mineral and enzyme. Pineapples are a best source of vitamin-C and free from cholesterol. The tender leaves of Moringa are especially rich in all contents and this can be better utilized after value addition. It can be achieved by making energy rich Moringa drink products *i.e.* Moringa pineapple flavor.

Materials and Methods
The experiment was laid out in Completely Randomized Design (CRD) with three replications and eight treatments at Pt. KLS College of Horticulture and Research Station, Rajnandgaon, Raipur, Chhattisgarh in laboratory condition, during 2020-21. Different treatment combinations of moringa leaf extract and pineapple extract are taken under study as shown in Table 1. Ripens well matured pineapple fruits were chosen for making moringa energy drink beverage with pineapple flavour. The selected fruits were cleaned with tap water free of dirt and unwanted material. The fruit is peeled, sliced removing the eyes and using a hand operated/screw type juicer extractor using hydraulic press and using a four layer muslin cloth to extract the juice.
After juice separation, as per treatment extract was taken for moringa energy drink making respectively. Calculated quantity of sugar is mixed in the moringa energy drink to maintain its TSS and acidity in the final product are maintained 0.3% by adding required amount of citric acid and sodium benzoate 100 ppm mixed in per litre moringa energy drink. The energy drink of moringa beverages prepared from moringa and pineapple fruit was assigned to oraganoleptic examination *i.e.* (color determination, flavor, taste determination, aroma) by group of judges following the nine point hedonic rating test as described by Ranganna (1997) [9] (Table 2). The overall acceptability of product was based upon the mean scores obtained from all the features studied under the analysis.

Table 1: Treatment details for preparing moringa energy drink (Pineapple flavour)

Ingredients used	Treatment Combination (%)			
	Moringa leaf extrant			Pineapple extract
20% of pulp extract, 15% of sugar, 0.3% of acidity as % of anhydrous citric acid and 100 ppm of sodium benzoate one liter of water	T_1	10	:	90
	T_2	15	:	85
	T_3	20	:	80
	T_4	25	:	75
	T_5	30	:	70
	T_6	35	:	65
	T_7	40	:	60
	T_8	Pure moringa leaf 20 % (Control)		

Table 2: Hedonic rating test scale for judging the product, Ranganna (1997) [9].

Score / Rating	Hedonic Scale
9	Like extremely
8	Like very much
7	Like moderately
6	Like slightly
5	Neither like nor dislike
4	Dislike slightly
3	Dislike moderately
2	Dislike very much
1	Dislike extremely

Results and Discussion

Storage behaviour under ambient environment condition

Organoleptic evaluation of energy drink of moringa was carried out by the group of 10 trained judges, which was stored under ambient environment conditions. Data related to difference in color score of energy drink of moringa during storage at 0, 30, 60 and 90 days under room temperature storage condition is presented in Table 3. The result revealed that the color of moringa energy drink with distinct treatment continuously declined with passage of time for 90 days. At the time of energy drink preparation that is at 0 day, highest score of color was noted 9.00 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), while least score of color was noted 6.43 with the treatment T_8 (Pure moringa leaves 20% (Control)). On other side, after 90 days storage, highest score of color was noted 6.47 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), whereas least score of color was recorded 4.00 with the treatment T_8 (Pure moringa leaves 20% (Control)). The results obtained in the present studies on color change are supported by Ali *et al.* (2017), Rathnayake *et al.* (2017) [10] and Dawn *et al.* (2015) [4].

Table 3 revealed that the after 30 days storage, highest score of appearance was noted 7.63 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), while least score of appearance was observed 5.30 with the treatment T_8 (Pure moringa leaves 20% (Control)). On other hand, after 90 days storage, highest score of appearance was noted 6.43 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), whereas least score of appearance was observed 4.10 with the treatment T_8 (Pure moringa leaves 20% (Control)). Similar result was also found by Fathima *et al.* (2001) [6].

In the present investigation, after 30 days storage, highest score of taste was obtained 8.03 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), while least score of taste was noted 5.57 with the treatment T_8 (Pure moringa leaves 20% (Control)). On other hand after 90 days storage, highest score of taste was recorded 6.17 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), whereas least score of taste was observed 3.57 with the treatment T_8 (Pure moringa leaves 20% (Control)) (Table 3). The other probable causes might be the displacement of flavour and taste related volatile substance that resulted in decline in acceptability in preservation at room conditions as supporting the findings of Ekeledo (2013) [5] and Rathnayake *et al.* (2017) [10].

The data presented in Table 4 expressed that after 30 days storage, highest score of aroma was noted 7.76 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75)as presented in Table 4, whereas least score of aroma was found 4.95 with the treatment T_8 (Pure moringa leaves 20% (Control)). On other side, after 90 days storage, highest score of aroma was recorded 6.56 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), while least score of aroma was noted 3.75 with the treatment T_8 (Pure moringa leaves 20% (Control)). The similar findings have also been reported by Rathnayake *et al.* (2017) [10], Manchekar *et al.* (2008) [8] and Ekeledo (2013) [5].

The result showed that after 30 days storage, highest score of overall acceptability was noted 29.57 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), whereas least score of overall acceptability was noted 20.03 with the treatment T_8 (Pure moringa leaves 20% (Control)) (Table 4). After 90 days storage, highest score of overall acceptability was observed 28.37 with the treatment T_1 (10:90) followed by treatment T_2 (15:85), T_3 (20:80) and T_4 (25:75), while least score of overall acceptability was found 18.87 with the treatment T_8 (Pure moringa leaves 20% (Control)). Similar findings was also suggested by Jan and Masih (2012) and Bhuiyan *et al*. (2012) [3].

Consumer acceptance test

A panel of ten persons carried out the organoleptic evaluation of moringa energy drink made from various combinations of treatment. This suggests that, good variations existed between the treatments and therefore panelists were able to assess the differences in the sensory attributes of the various formulations. Result showed that the various treatment as recipes noted oraganoleptic grades between5.95 to 9.00 (Table 5).

The mean score data for color, appearance, taste, aroma and overall acceptance (Table 5, Fig. 1,) shows that Treatment T1 (10:90) (9.00) was more highly rated for color. Minimum proportion of Moringa juice in the formulation improved the color appreciation by the panelists. This could be attributed to consumers not being familiar with green beverages, and hence the less green the color of the juice the higher it was scored. The highest mean score, (9.00) (Table 5) for taste was obtained when Moringa leaf extract at its lowest level. The taste of the beverage was not much liked when moringa at the maximum level.

The least acceptable taste and aroma (mean score of 6.57 and 5.95 respectively, Table 5) was found in Treatment T_8 (Control)) that had the pure fresh moringa leaf extract (20%). Using fresh moringa juice without mixing it with pineapple resulted in a taste and aroma that was least liked by the consumers. A reduction in the amount moringa blended with maximum level of pineapple gave an acceptable highest mean score of 9.00 and 8.72 respectively (Table 5). The decrease in aroma and taste score with increasing Moringa levels was

probably due to the strong herbal flavor.

The recipe T_1 (Moringa leaf extract: Pineapple extract:: 10:90) not only obtained top score in overall acceptability but also high rated in color (9.00), appearance (8.63), taste (9.00) and aroma (8.76) as compared to other recipes.. The result showed that the judges like moringa energy drink with moringa leaves extract: pineapple pulp extract (10:90). The results obtained in the present studies are support by the Bhuiyan *et al*. (2012) [3] and Ekeledo (2013) [5].

Table 3: Storage behaviour of energy drink of moringa blended with pineapple.

Treatment combination (Moringa leaf extract: Pineapple extract)	Color				Appearance				Taste			
	Storage period (in days)				Storage period (in days)				Storage period (in days)			
	0	30	60	90	0	30	60	90	0	30	60	90
T_1 (10:90)	9.00	7.97	7.00	6.47	8.63	7.63	6.63	6.43	9.00	8.03	7.03	6.17
T_2 (15:85)	8.32	7.32	6.32	5.82	8.23	7.23	6.23	6.03	8.27	7.27	6.27	5.27
T_3 (20: 80)	7.70	6.70	5.70	5.20	7.82	6.82	5.82	5.62	7.87	6.83	5.83	4.83
T_4 (25:75)	7.44	6.44	5.44	4.94	7.40	6.40	5.40	5.20	7.83	6.77	5.77	4.75
T_5 (30:70)	7.15	6.15	5.15	4.65	7.02	6.02	5.02	4.87	7.73	6.73	5.73	4.73
T_6 (35: 65)	6.97	5.97	4.97	4.47	7.00	6.00	5.00	4.82	7.37	6.37	5.37	4.37
T_7 (40:60)	6.85	5.85	4.85	4.35	6.70	5.70	4.70	4.50	6.80	5.80	4.80	3.80
T_8 (Pure moringa leaf 20% as control)	6.43	5.47	4.43	4.00	6.30	5.30	4.30	4.10	6.57	5.57	4.57	3.57
SEm (±)	0.16	0.14	0.12	0.11	0.16	0.14	0.12	0.12	0.16	0.14	0.12	0.11
CD (1%)	0.67	0.59	0.37	0.48	0.67	0.59	0.50	0.52	0.68	0.61	0.53	0.45
CV (%)	3.76	3.81	3.95	4.06	3.78	3.84	3.91	4.19	3.70	3.85	3.92	4.05

Table 4: Storage behavior of energy drink of moringa blended with pineapple.

Treatment combination (Moringa leaf extract: Pineapple extract)	Aroma				Overall acceptability			
	Storage period (in days)				Storage period (in days)			
	0	30	60	90	0	30	60	90
T_1 (10:90)	8.76	7.76	6.76	6.56	30.57	29.57	28.57	28.37
T_2 (15:85)	8.53	7.53	6.53	6.33	28.80	27.80	26.80	26.60
T_3 (20: 80)	7.65	6.65	5.65	5.45	26.60	25.60	24.60	24.40
T_4 (25:75)	7.60	6.60	5.60	5.40	26.20	25.20	24.20	24.00
T_5 (30:70)	7.33	6.33	5.33	5.13	24.63	23.63	22.63	22.43
T_6 (35: 65)	6.65	5.65	4.65	4.45	24.00	23.00	22.00	21.80
T_7 (40:60)	6.50	5.50	4.50	4.30	22.33	21.33	20.33	20.13
T_8 (Pure moringa leaf 20% as control)	5.95	4.95	3.95	3.75	21.00	20.03	19.10	18.87
SEm (±)	0.15	0.13	0.12	0.12	0.55	0.54	0.53	0.54
CD (1%)	0.64	0.57	0.51	0.51	2.27	2.26	2.20	2.27
CV (%)	3.64	3.75	4.01	4.17	3.74	3.86	3.93	4.08

Table 5: Mean consumer scores for color, appearance, taste, aroma and overall acceptance with moringa energy drink)

Treatment combination (Moringa leaf extract: Pineapple extract)	Color	Appearance	Taste	Aroma	Overall acceptability	Rating
T_1 (10:90)	9.00	8.63	9.00	8.76	8.85	Like very much
T_2 (15:85)	8.32	8.23	8.27	8.53	8.34	Like moderately
T_3 (20: 80)	7.70	7.82	7.87	7.65	7.76	Like slightly
T_4 (25:75)	7.44	7.40	7.83	7.60	7.57	Like slightly
T_5 (30:70)	7.15	7.02	7.73	7.33	7.31	Like slightly
T_6 (35: 65)	6.97	7.00	7.37	6.65	7.00	Like slightly
T_7 (40:60)	6.85	6.70	6.80	6.50	6.71	Like slightly
T_8 (Pure moringa leaf 20% as control)	6.43	6.30	6.57	5.95	6.31	Like slightly

Conclusion

On the basis of result, the quality and sensory evaluation like color, appearance, taste, aroma and overall acceptability significantly superior in the treatment T_1 (Moringa leaf extract: Pineapple extract: 10:90) followed by treatment T_2 (15:85). There for it may be concluded that treatment T_1 (Moringa leaf extract: Pineapple extract:: 10:90) may be prefer for making best quality moringa energy drink blended with pineapple flavour.

References

1. Ali MA, Yusof YA, Chin NL, Ibrahim MN. Processing of moringa leaves as natural source of nutrients by optimization of drying and grinding mechanism. Journal of Food Process Engineering. 2017;40(6):12583.
2. Jan Awsi, Masih Er. Dorcus. Juice pineapple (*Ananas comosus*), carrot (*Daucus carota*), and orange (*Citrus sinensis*) were optimised to a blended beverage which was stored for 21 days in pet bottles (400 ml capacity) at refrigerated temperature. Trees for Life Journal. 2012;9(7):395-399.
3. Bhuiyan Mohiuddin Ahmed, Mohammad Shahriar, Md. Ismail Hossain, Abu Nizam Md Bahar, Sadika Akhter. Preliminary phytochemical screening, in-vitro antioxidant and cytotoxic activity of five different extracts of *Moringa oleifera* leaves. Journal of Applied Pharmaceutical Science. 2012;02(05):65-68.
4. Dawn C, Ambrose Daunty A. *Moringa oleifera* mothers best friend: An ideal health food, Beverage & Food World. 2015;40(2):33-34.
5. Ekeledo Esther. Development and evaluation of turmeric: ginger based pineapple drinks and food flavourings.

Asian Journal of Plant Science and Research. 2013;3(3):139-141.
6. Fathima A, Begum K, Rajalakshmi D. Microwave drying of selected greens and their sensory characteristics. Plant Foods for Human Nutrition. 2001;56:303-311.
7. Fuglie LJ. ECHO Development Notes 2009; 105: 1-8.
8. Manchekar MD, Zende UM, Naik KR. Processing and value addition to curry leaves through drying and dehydration. International Drying Symposium. 2008, 706-708.
9. Ranganna S. Handbook of analysis of quality control of fruit and vegetable product, 2nd edition Tata McGraw-Hill, New Delhi, India. 1997.
10. Rathnayake, ARMHA, Navarathna SB. Determination of dehydration pattern and sensory Properties variation of blanched and unblanched, cut and whole *Moringa oleifera* leaves. International Journal of Advanced Engineering Research and Science. 2017;4:3.