

STUDIES ON ORGANOLEPTIC QUALITIES OF ORANGE BASED BLENDED READY-TO-SERVE (RTS) BEVERAGES

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ABSTRACT

Organoleptic changes in orange based blended ready-to-serve (RTS) beverages were studied during its storage. The present study was comprised of two level of preservative (750 ppm and 500 ppm KMS), three level of recipe (orange, pomegranate, aonla and ginger juice) and two blending ratio (90:10:0, 86:10:4). These experiments have nine treatment combinations viz., T-0 (control, 100% orange juice with 750 ppm KMS), T-1 (Orange-aonla-ginger (90:10:0) with 750 ppm KMS), T-2 (Orange-aonla-ginger (86:10:4) with 750 ppm KMS), T-3 (Orange-pomegranate-ginger (90:10:0) with 750 ppm KMS), T-4 (Orange-pomegranate-ginger (86:10:4) with 750 ppm KMS), T-5 (Orange-aonla-ginger (90:10:0) with 500 ppm KMS), T-6 (Orange-aonla-ginger (86:10:4) with 500 ppm KMS), T-7 (Orange-pomegranate-ginger (90:10:0) with 500 ppm KMS), T-8 (Orange-pomegranate-ginger (86:10:4) with 500 ppm KMS). The different organoleptic characteristics viz., colour, taste, flavor and overall acceptability were recorded at 30 days interval upto 90 days. Among the tested treatments with regard to the organoleptic characteristics, the treatment T-4 obtained maximum sensory scores viz., colour (7.33), flavor (8.87), taste (8.99) and overall acceptability (7.67) throughout the storage period.

INTRODUCTION

Every fruits have specific nutritional value, colour, taste and flavour. Fruits are important source of vitamins, minerals, fibre and carbohydrates etc. Orange specially, the sweet orange (*Citrus sinensis* L.) is a deciduous tree belongs to family Rutaceae. Sweet orange is the most commonly grown fruit in the world and widely cultivated in tropical and sub-tropical climates for the delicious sweet fruit which is peeled or cut (to avoid the bitter rind) and eaten whole, or processed to extract orange juice, ready-to-serve (RTS) beverages, cordial, nectar etc. In India, orange has been cultivated in 3,11,176 ha area with an annual production of 29.06 lakh tonnes (Anonyms, 2013). Major orange producing states are Maharashtra, Madhya Pradesh, Rajasthan, Tamil Nadu, Assam and Tripura. In some parts of Madhya Pradesh, particularly in Mandsaur, Neemuch, Chhindwada, Betul and Ujjain districts, orange is being cultivated on large scale. The area under orange in Madhya Pradesh is about 49,520 ha and production is 8,44,000 MT with productivity of 17.0 MT/ha (Anonyms, 2013).

Any attempt to prepare a fruit product is incomplete if its storage stability is not properly studied. Orange has a greater variety of beverage and for improving the taste, aroma, palatability, nutritive value and reducing bitterness orange juice was blended with some other highly nutritive fruit juices namely pomegranate and aonla juice with spice extracts like ginger. The utilization of these fruits for preparation of various processed product become limited, despite their high nutritional qualities. The blending of two or more fruit juices

with spices extract for preparation of nutritive RTS beverages is thought to be a convenient and economic alternative for utilization of these fruits. Langthasa (1999), Deka (2000), Deka and Sethi (2001) reported that two or more fruits juice/pulp may be blended in various proportions for the preparation of nectar, RTS beverages etc. the blending of juice may also improve aroma, taste and nutrients of beverages.

The nutritive value of fruit beverages is much more than the synthetic products, which are available in the market throughout the country. If synthetic drinks can be substituted with the fruit juice, it would be beneficial to the consumers as well as fruit growers. Looking to the demand of natural beverages, there is great scope for the preparation of juices and other fruit based beverages. RTS is a type of fruit beverage containing at least fruit juice (10%), total soluble solids (10%) and acidity (0.3%). Therefore, the present study was carried out to evaluate the organoleptic qualities of orange based blended ready-to-serve (RTS) beverages.

MATERIALS AND METHODS

The study was carried out in the Department of Post Harvest Management, K.N.K. College of Horticulture, Mandsaur (M.P.). Fresh, fully mature and uniform fruits of orange were taken from the farmer's orchard and used for experimentation. The immature, brownish, damaged and off type fruits were discarded. Whereas fruits of, pomegranate, aonla and ginger were purchased from local market. Fruit juice was extracted by spiral coil type juice extractor machine and blended as per recipe treatment. The experiment comprised of nine treatment

combinations consisting four level of juice (orange juice, pomegranate juice, aonla juice and ginger juice) and two level of preservative (750 ppm + 500 ppm KMS). The details of various treatment combinations are presented in Table 1.

Preparation of orange based blended ready-to-serve (RTS) beverages

After extraction of juice from all the fruits its total soluble solids (TSS) and acidity were measured. Then according to different recipe treatment, the quantity of juice, sugar, citric acid, preservative (KMS) and water were calculated. For the preparation of orange based blended RTS beverage of different recipe, syrup of sugar, water and citric acid was prepared. The prepared orange based blended RTS beverage filled in clean sterilized plastics bottle of 200 ml capacity. Prepared orange based blended RTS beverage bottle were stored in dries place at ambient temperature (Room temperature).

The observation on different organoleptic characteristics viz., colour, taste, flavor and overall acceptability were recorded at an interval of 30 days up to 90 days of storage. The evaluation was done on a nine point hedonic scale as given by Ranganna (1978) through a panel of 15 judges. The data were analyzed statistically through ANOVA using CRD factorial design.

RESULTS AND DISCUSSION

Colour

The colour retention product during storage is an important objective because it attracts the attention of consumer and thus influences the market price. The colour of orange based blended RTS beverages decreased with the advancement of storage period. The maximum colour value 7.33 was recorded

in T-4 treatment and minimum of 6.94 was recorded in T-0 treatment at the end of storage period (90thdays). The colour value was higher at 0 day of storage but it decreased up to 90thdays of storage (Table 2). The deterioration of colour is due to enzymatic activity and oxidation in the orange based blended RTS beverages. The colour value of RTS was significantly affected by different recipe and treatment combinations. The present results are supported by Bezman *et al.* (2001), Singh (2002) and Murtaza *et al.* (2004).

Flavour

It is evident from results that flavour of orange based blended RTS beverages deteriorated with advancement of storage period. The rate deterioration in flavour was significantly influenced by recipe and treatment combinations. On 90th day of storage the maximum flavour value 7.26 was retained at T-4 treatment followed by T-8 (7.24) treatment and minimum flavour value 6.37 was recorded in T-0 treatment (Table 2). The reduction in flavour value may be due to oxidation and enzymatic activity in the RTS beverage. Similar reduction in flavour was recorded by Rao *et al.* (1979), Tiwari (2000) and Jain *et al.* (2003) which strongly support the present findings.

Taste

The taste value of orange based blended RTS beverages decreased with the increased in storage period upto 90thdays. The rate of reduction in taste was significantly affected by recipe and treatment combination. At the end of storage period the maximum taste value 7.63 was found in T-4 treatment and minimum taste value of 5.20 was recorded in T-0 treatment (Table 2). Similar reduction in taste value of orange drink was reported by Jain *et al.* (2003).

Overall acceptability

Table 1: Detail of treatment combinations

S.N.	Treatment combinations	Symbols
1.	Control (100% orange juice with 750 ppm KMS)	T-0
2.	Orange-aonla-ginger (90:10:0 with 750 ppm KMS)	T-1
3.	Orange-aonla-ginger (86:10:4 with 750 ppm KMS)	T-2
4.	Orange-pomegranate-ginger (90:10:0 with 750 ppm KMS)	T-3
5.	Orange-pomegranate-ginger (86:10:4 with 750 ppm KMS)	T-4
6.	Orange-aonla-ginger (90:10:0 with 500 ppm KMS)	T-5
7.	Orange- aonla-ginger (86:10:4 with 500 ppm KMS)	T-6
8.	Orange-pomegranate-ginger (90:10:0 with 500 ppm KMS)	T-7
9.	Orange-pomegranate-ginger (86:10:4 with 500 ppm KMS)	T-8

Table 2: Effect of recipe treatments on organoleptic characteristics of orange based blended RTS beverages during storage

Parameter Storage Period (days)	Colour (Score)				Flavour (Score)				Taste (Score)				Overall Acceptability (Score)			
	0	30	60	90	0	30	60	90	0	30	60	90	0	30	60	90
T-0	8.32	7.15	7.09	6.94	7.52	6.56	6.48	6.37	6.83	5.96	5.69	5.2	6.68	5.66	5.53	5.43
T-1	8.55	7.28	7.19	7.09	8.7	7.52	7.41	7.19	8.7	7.55	7.35	7.2	8.29	7.31	7.24	7.13
T-2	8.51	7.19	7.12	7.03	8.71	7.56	7.36	7.21	8.7	7.69	7.36	7.21	8.31	7.41	7.31	7.21
T-3	8.61	7.29	7.15	7.06	8.71	7.69	7.39	7.2	8.97	7.85	7.46	7.23	8.37	7.37	7.21	7.1
T-4	8.71	7.64	7.43	7.33	8.87	7.74	7.56	7.26	8.99	8.13	7.87	7.63	8.99	8.01	7.88	7.67
T-5	8.51	7.29	7.15	7.06	8.69	7.47	7.36	7.18	8.7	7.26	7.23	7.18	8.28	7.37	7.23	7.13
T-6	8.49	7.18	7.11	7.02	8.69	7.44	7.34	7.23	8.69	7.48	7.35	7.2	8.29	7.32	7.25	7.18
T-7	8.58	7.52	7.28	7.25	8.83	7.54	7.37	7.18	8.85	7.41	7.36	7.2	8.36	7.26	7.2	7.09
T-8	8.69	7.29	7.27	7.22	8.85	7.62	7.48	7.24	8.86	7.86	7.77	7.59	8.87	7.69	7.44	7.26
SEm ±	0.01	0.03	0.02	0.03	0.01	0.09	0.03	0.02	0	0.06	0.06	0.05	0.01	0.06	0.05	0.03
CD at 5%	0.02	0.08	0.05	0.09	0.03	0.25	0.08	0.05	0.01	0.18	0.18	0.15	0.02	0.18	0.16	0.09

The data on overall acceptability of orange based blended RTS beverages revealed that it decreased as the storage period increased. However the rate of decline was significantly influenced by recipe and storage period. The colour, taste, flavour are important consideration for overall acceptability of orange based blended RTS beverage. At the end of storage period the highest overall acceptability value 7.67 was recorded in T-4 treatment followed by T-8 (7.26) treatment and the lowest value 4.05 was recorded in T-0 treatment (Table 2).

The present findings are accordance with findings reported by Jain *et al.* (2003) in orange drinks. Pandey (2004) observed the organoleptic quality of guava RTS beverage and squash gradually decreased at ambient temperature for 5 months. Organoleptic score decreased gradually with increase in storage period at room temperature (24.4-38.5°C) and acceptability of blended RTS under studies was maintained up to three months (Tiwari and Deen, 2015). Similar findings were reported by Satkar *et al.* (2013) for bitter guard RTS in which they found that RTS to be more acceptable after 3 months of storage when stored in refrigerated system.

The present study revealed that the organoleptic characteristics of orange based blended RTS beverages viz., colour, taste, flavor and overall acceptability were significantly influenced by different recipe treatments and storage period. On the basis of sensory scores the treatment T-4 (Orange-pomegranate-ginger (86:10:4) with 750 ppm KMS) was found best with regard to the organoleptic characteristics throughout the storage period.

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