

Sensory Quality and Acceptability of Fresh Juices

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ABSTRACT The study evaluated consumer acceptance of the appearance, aroma, taste and overall acceptability of fresh juices to support the development of fresh juices designed to exploit the sensory characteristics and nutritional advantages of fresh vegetables and to meet the needs of modern consumers, who increasingly buy products to save time, without abandoning a healthy diet. Carrot, wheat grass, and bitter gourd juices were assessed for the total moisture content, total solids, total soluble solids and sensory analysis.

INTRODUCTION

Health drinks are natural drinks that contain a balanced amount of nutrients and minimal amounts of sugar, fat and salt. High consumption of fruits and vegetables is associated with decreased risk of coronary heart disease, prostate cancer and Alzheimer's disease (Joshi et al. 2001; Schurman et al. 1998; Dai et al. 2006). Today busy families have less free time to prepare nutritious, home-cooked meals. In this context, juices obtained by squeezing fruit without any pasteurization treatments represent an alternative way of consuming fresh fruit and vegetables. Furthermore, these products meet the needs of modern consumers, who increasingly buy ready-to-eat food to save time, without giving up the pleasure and nutritional intake linked to healthy diet (Endrizzi et al. 2009).

Locally available health drinks like wheat grass, carrot, and bitter gourd were taken up in this present study. Wheat grass (*Triticum aestivum*) has quickly become "the new age espresso" offered in smoothies and juices, salads and even in tablets and powders and is one of the cereal grasses mostly used as a health drink (Ben-Arye et al. 2002). Bitter gourd (*Mimordica charantia* L.) called Balsam pear is one of the most common vegetable of Indo-Pakistan sub continent. It is known to possess many medicinal properties (Adam 1981). Carrot (*Daucus carota*) juice because of its many healthful benefits, is called the miracle juice. It is a rich source of carotene and contains other vitamins, like thiamine, riboflavin, vitamin B-complex and minerals (Walde et al. 1992). Fruit and vegetable juices have become important in

recent years due to overall increase in natural juice consumption as an alternative to the traditional caffeine containing beverages such as coffee, tea, or carbonated soft drinks (Kaur et al. 2009). To derive the maximum benefit of its goodness of nutrients, these vegetables should be consumed fresh. The objective of this paper is to assess, the intensity of sensory attributes, and the acceptability evaluated by consumers of fresh juices from different vegetables.

MATERIAL AND METHODS

A clear juice of carrot, wheat grass and bitter gourd was prepared, and a quality evaluation model for the drink was established with a view of providing some technological references for practical production. The vegetables were purchased from the local market, sorted, graded and washed thoroughly to remove adhering foreign materials. Vegetables were cut and seeds were removed. The juice was extracted by grating followed by pressing in basket press. Water (25%) was added to crushing media to get more after quantity, good viscosity of the soft drink. Lemon juice was added at the level of 0.1 ml to 1 ml of carrot juice. Sugar was replaced with aspartame in both wheat grass and bitter gourd juice at 1 g to 4 g. Moisture contents of the samples were determined in triplicate, at $103 \pm 2^\circ\text{C}$ for 2 hours using the air oven drying method in accordance with AOAC (1990) method and results recorded in %. Brix % is generally used as indicator for soluble solid content %. The total soluble solids of the juice samples were evaluated using digital refractometers Palette Series (Atago Co. Ltd., Japan). The extracted juice was added with sugar (control) and artificial sweet-

ener aspartame at 2.5, 5 and 7.5% level (experimental group).

A sensory evaluation test was done to determine the quality and consumer acceptance of the juices. The samples were coded. Then, the tasters were given an evaluation form. They were asked to taste one sample at a time, and record their responses allowing time between samples so that the tasters can record their opinion. In this test, a 10-member trained panel was selected to evaluate the quality of fresh and processed juices. A 1 to 5 structured scale was used for appearance, aroma, taste and overall acceptability.

RESULTS AND DISCUSSION

The moisture content (Table 1) in control samples of wheat grass, bitter gourd and carrot juice was 96%, 95% and 94% respectively. The essential component of any beverage is the water that it contains; other components such as stimulants, coloring and flavoring ingredients may perform some useful functions but they are not essential to the proper physiological function of the body (Ihekoronye and Ngoddy 1985). Adubofuor (2010) studied the moisture content of processed cocktail juices and reported 90 to 95% of moisture and 10.00 to 10.50% of total soluble solids which were similar to the present study. Total solids (Table 1) were 4.0%, 4.5%, and 6% respectively and the total soluble solids 1.7-1.8[°]B, 1-1.1[°]B and 5.6-5.8[°]B respectively which were in agreement to the study done by Sairi et al. (2004). The total soluble solids increased significantly as the aspartame sweetener content increased from 4.0-4.2 [°]B to 9.6-9.8 [°]B for both wheat grass and bitter gourd juices prepared, where as for carrot juice it was seen that addition of lemon juice had no significant impact on the total soluble solids as seen in Table 2. Adubofuor (2010) reported similar values of total soluble solids (4 and 5.50% respectively) for two different varieties of tomatoes. Sairi (2005) studied the total soluble solids (brix values) for deacidified pine apple juice and observed that they remained essentially unchanged from 10.50 to 10.17% Brix and the results from sensory evaluation test showed a higher overall acceptance for the electro-dialysed pineapple juice compared to the fresh juice.

The average score by the taste panellists was low for all the sensory attributes of bitter gourd

Table 1: Moisture content and total solids (TS) of carrot, wheat grass and bitter gourd juice

	Wt of the sample (gm)	Wt after (gm)		Moisture content (%)	Total solids (%)
		Four hours	Five hours		
Carrot	5	0.4	0.3	94	6
Wheat grass	5	0.2	0.2	96	4
Bitter gourd	5	0.3	0.2	95	5

Moisture content (%) = (W1-W2)x100/W1

Total solids (%) = 100- moisture content.

Table 2: Total soluble solids (TSS) and total sugars (TS) of carrot juice, wheat grass and bitter gourd juice

Variant (sample)	Additive	°B	
		TSS	TS
Carrot Juice	Lemon juice (ml)		
A	0	5.6	5.8
B	0.1	5.6	5.7
C	0.2	5.7	5.9
D	0.3	5.6	5.6
E	0.5	5.5	5.7
Wheat Grass	Aspartame (g)		
A	0	1.7	1.8
B	1	4.7	4.9
C	2	7.1	7.4
D	3	9.6	9.8
Bitter Gourd	Aspartame (g)		
A	0	1	1.1
B	1	4	4.2
C	2	6.4	6.8
D	3	9.0	9.2

juice of control variant, 1g added aspartame variant and 2g added aspartame variant, while a good was given after rating to 3g aspartame added variant. Bitterness was the characteristic that determined the preference of consumers. Bitter sensation is not by itself appealing to most people (Drewnowski and Carmen 2000), so hence it could be the reason for low acceptability of bitter gourd juice.

Fresh wheat grass juice of control and experimental variants had fair to good acceptability and nearly good acceptability scores in both the variants of control and experimental carrot juice with and without lemon. Karovičová and Kohajdová (2002) studied the sensory and chemical evaluation of cabbage-carrot juices and the correlation coefficients between the taste variables and have seen similar results as regard to sensory evaluation. For colour, no differences were noticed as the colour of the three juices was in the range of good to very good. A slightly characteristic to uncharacteristic at-

tribute was found in aroma analysis of all the three samples (Table 3). On the whole, the taste panellists accepted the carrot juice with 0.3 ml of lemon juice better.

Table 3: Sensory evaluation scores of carrot, wheat grass and bitter gourd juice

Variant/sample	Appearance	Aroma	Taste	Overall acceptability
Carrot Juice				
A (basic)	4	4	4	4
B (0.1ml lemon juice)	4	4	4	4
C (0.2ml lemon juice)	4	4	3	4
D (0.3ml lemon juice)	4	3	3	4
E (0.4ml lemon juice)	3	2	2	3
Wheat Grass				
A (basic)	4	3	4	4
B (1 g aspartame)	4	3	3	4
C (2 g aspartame)	4	3	4	4
D (3 g aspartame)	4	3	4	4
Bitter Gourd				
A (Basic)	4	2	2	2
B (1 g aspartame)	4	2	2	2
C (2 g aspartame)	4	3	3	3
D (3 g aspartame)	3	3	4	4

1- very poor

2- poor

3- neither poor nor good

4- good

5- very good

CONCLUSION

This study provides a useful insight into production and marketing strategies for a new juice line for the early morning joggers that could be accompanied by the key message: Just fresh fruit: all the pleasure and nutritional intake of fruit in an appealing drink. However further research on microbiological assay for the same needs to be taken up.

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