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Formulation and quality analysis of detox drink

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Abstract

Cucumber, Lemon, Ginger, Mint leaves, Cinnamon and Apple cider Vinegar were optimized, blended in a Warring blender, for the formulation of standard and the extract was stored in a PET bottle under refrigerated temperature of 12 °C for 5 days. Two variants (V1 and V2) were prepared with added wheat grass at 0.5% and 1%. All the three beverages were evaluated for Physico-chemical and Sensory analysis (9 point hedonic scale). Marginal changes in acidity and Vitamin-C were observed. Vitamin-C (2.6mg) decreased and the acidity of the juice (1.89 – 2.11) increased progressively during the shelf life. The mean overall acceptability scores were above 8 on Day 1 and lessened throughout the storage period. The samples were rejected on the 5th day of storage (rejection score \leq 6). The product is recommended for obese and young people and is to be consumed within 3 days.

Keywords: Wheat grass, Apple cider vinegar, Cinnamon, Weight loss, Detox, Functional Beverage

1. Introduction

Wheatgrass, has been a vital part of Indian tradition for many years, and has been known to have notable medicinal properties. Scientifically called as *Triticum aestivum*, it belongs to the family Poaceae [1]. Wheat grass has been proved to contain essential amino acids, active enzymes, flavonoids, chlorophyll, minerals, proteins and vitamins which are beneficial for health. Because of these components wheat grass endows antibacterial, antioxidant, anticancer and antiulcer property. Purification of Blood, Cleansing of Colon and liver detoxification are the positive effects of wheat grass on human body and acts as a defense from carcinogens [2], [3]. The antioxidant properties is due to the presence of chlorophyll, a phytochemical which reverses aging, improves appetite, cleanses the body, resists odor, and prevents cancer [4].

The most popular vinegar with the public is the Apple Cider Vinegar and claims to have beneficial effects such as weight loss and plays an important role in heart health. Kondo et.al [5] found the role of Apple Cider Vinegar in the reduction of belly fat, waist circumference, triglycerides and aids in curing of sore throat. As showed by Ostman *et al.* [6] and Johnston C N *et al.* [7] apple cider vinegar also helps in the lowering of blood glucose and insulin levels and increases the satiety after a meal.

Cinnamon is a substance with powerful medicinal properties and has polyphenols, which protects the body from oxidative damage caused by free radicals [8, 9]. Pasupuleti [10] showed that the antioxidants present in cinnamon has a potent anti-inflammatory activity and is recommended to be used in daily life. Cinnamon helps to decrease the amount of glucose that enters the bloodstream by interfering with various digestive enzymes slowing down the breakdown of complex carbohydrate in the gastrointestinal tract [11].

Juice blending is one of the best approaches to improve the nutritional value of the juice. It can improve the vitamin and mineral bulk depending on the kind and quality of vegetables used [12]. Apart from the nutritional status improvement, blended juice can be improved in its effects by acting as a natural detox. The present study therefore is aimed for the development of a new product through blending in the form of a natural detox drink and is looked on as being served as an appetizer.

2. Materials and Methods

2.1 Materials

Freshly harvested Wheat Grass, Cucumber, Ginger, Lemon and Mint leaves were procured from the local market of Chennai. All chemicals used were of analytical grade and were purchased from HiMedia (India).

Table 1: Formulation of Standard, Variant 1 and Variant 2

Ingredients	Standard	Variant 1	Variant 2
Water	1000ml	1000ml	1000ml
Cucumber	200g	200g	200g
Lemon Juice	10ml	10ml	10ml
Ginger Sliced	5g	5g	5g
Apple Cider Vinegar	5ml	5ml	5ml
Mint Leaves	20 g	20 g	20 g
Cinnamon powder	5g	5g	5g
Wheat Grass	-	5g	10g

2.1 Methods

Drink Preparation

The cucumbers were washed with Sodium Chloride solution (58.44g/l), scrubbed with a clean vegetable brush and again washed with warm water. To eliminate the bitter taste, the tip of the cucumber was cut and rubbed repeatedly with the cut off cucumber, making light foam. At the end, they were peeled, sliced and added to a jug containing one litre of water. A thumb of fresh ginger was washed well, peeled and cut into small pieces along with the fresh mint leaves and added to the jug of water. Lime juice was extracted using a household mixer and added to the water containing the sliced cucumbers. They were all blended in a waring blender along with Apple Cider Vinegar and Cinnamon powder in proportions (Table 1). Three batches of samples were extracted and to each, different concentrations of air dried and powdered wheat grass was added. They were transferred into sterilized PET Bottles and kept under refrigerated temperature of 12 °C for 14 hours. After the completion of Infusion all three batches were strained through a strainer and ready for consumption.

2.3 Methodology for tests performed

All estimations were carried out in triplicate at 5 days interval and the mean values were reported.

Determination of Total acidity (as % citric acid)

Sample of the drink (10ml) was diluted to 250 ml with distilled water and was measured by potentiometric method according to AOAC 942.25B [13].

Determination of Ascorbic Acid

Sample solution equivalent to 0.2 mg/ml ascorbic acid was prepared in distilled water containing 3% (w/v) metaphosphoric acid. It was titrated against standard 2, 6 dichlorophenol indophenol (2, 6 DCIP) solution of 0.5 mg/ml concentration until the pink color developed. The same process was repeated with blank [14].

Sensory and Statistical Analysis

Thirty millilitres of each sample was served in a 50 ml glass beaker and tested by a sensory panel consisting of thirty semi-trained members drawn from the School of Food Science, MOP Vaishnav College for Women. The temperature of the detox drink was 26 ± 2 °C at the time of tasting. The samples were coded with three digit random numbers and served randomly. Color, Flavor, Aroma, Taste and Overall

Acceptability was determined based on a 9-point Hedonic scale, where “like extremely” (9) and “dislike extremely” (1) as described by Amerine *et al.* 1965 [15]. The overall acceptability of the product was the considered aspect and the results were converted to numerical values. Results were presented as means \pm standard deviations.

3. Results and Discussions

Titratable acidity

There was a significant increase in titratable acidity content during storage due to the addition of lemon juice. It was observed that the maximum acidity 2.6% was recorded on Day 1 and 2.65% on Day 5 in the standard sample (Refer Table 2)

Ascorbic Acid content

It has been shown that ascorbic acid can be taken as an index of nutrient quality of foods [16]. The ascorbic acid (vitamin C) content of the juice decreased during storage with the advancement of storage period as shown in Figure 1 and Table 3 which was probably due to the fact that ascorbic acid being sensitive to oxygen, light and heat was easily oxidized in presence of oxygen by both enzymatic and non-enzymatic catalyst (Mapson, 1970) [17]. Among the beverages prepared Variant 2 consisting of 1% of wheatgrass was better in ascorbic acid content with a maximum Ascorbic acid of 6.82mg/100ml. Wheatgrass when blended with the cucumber and lemon juice boosted their nutritional quality in terms of Vitamin C content.

Sensory quality score

As shown in Figure.1a the sensory quality of the Standard, Variant 1 and Variant 2 were in the acceptable range and with the increase in storage period (Day 5) Figure.1b showed a minor decrease in the overall acceptability (rejection score being ≤ 6). Variant 1 had an increasing sensory parameter when compared to the other two samples on Day 1 and Day 5 (Figure 2a & 2b, Table 4a & 4b). Thus, it can be concluded that the panelists liked Variant 1 more than Variant 2 for this type of a drink. The lesser score for Variant 2 (1% of wheatgrass) could be originated from the bitter taste of wheatgrass.

Table 2: Titratable Acidity of the Beverages as on Day 1 and Day 5; Standard: Nil% Wheatgrass Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass

Treatments	Day 1	Day 5
Standard	2.6	2.65
Variant 1	1.89	2.11
Variant 2	2.02	2.24

Table 3: Vitamin C Content (mg) of the Beverages as on Day 1 and Day 5; Standard: Nil% Wheatgrass Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass

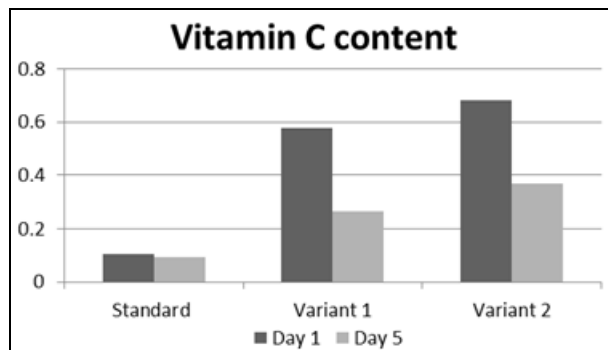
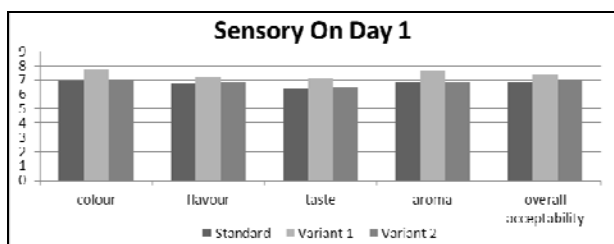
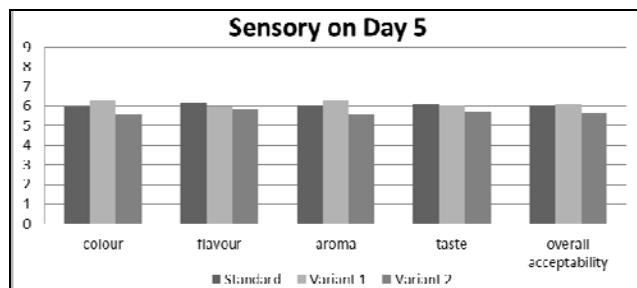
Treatments	Day 1	Day 5
Standard	0.105	0.096
Variant 1	0.5775	0.2625
Variant 2	0.6825	0.3675

Table 4a: Sensory Quality Scores of the Detox Drink on Day 1 Results are expressed as means \pm Standard Deviation. Standard: Nil Wheatgrass; Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass.

Treatment	Colour	Flavour	Aroma	Taste	Overall Acceptability
Standard	6.96 ± 1.16	6.71 ± 1.06	6.48 ± 1.08	6.89 ± 1.44	6.84 ± 1.32
Variant 1	7.74 ± 1.07	7.21 ± 1.54	7.12 ± 1.64	7.66 ± 1.16	7.38 ± 1.41
Variant 2	7.09 ± 1.68	6.84 ± 1.49	6.53 ± 1.43	6.89 ± 1.53	7.07 ± 1.67

Table 4b: Sensory Quality Scores of the Detox Drink on Day 5; Results are expressed as means \pm Standard Deviation. Standard: Nil Wheatgrass; Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass.

Treatment	Colour	Flavour	Aroma	Taste	Overall Acceptability
Standard	5.98 \pm 1.02	6.17 \pm 1.06	6.01 \pm 1.03	6.10 \pm 1.04	6.03 \pm 1.01
Variant 1	6.26 \pm 1.21	5.94 \pm 1.03	6.32 \pm 1.22	6.05 \pm 0.99	6.12 \pm 1.05
Variant 2	5.57 \pm 1.02	5.84 \pm 1.00	5.60 \pm 1.01	5.76 \pm 1.02	5.66 \pm 1.01

**Fig 1:** Vitamin C Content (mg) of the Beverages as on Day 1 and Day 5**Fig 2a:** Sensory Quality Scores of the Detox Drink on Day 1: Standard: Nil% Wheatgrass; Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass.**Fig 2b:** Sensory Quality Scores of the Detox Drink on Day 5: Standard: Nil% Wheatgrass Variant 1: 0.5% Wheatgrass; Variant 2: 1% Wheatgrass.

4. Conclusions

It was concluded that the detox drink – Variant 1, having a blend of cucumber, ginger, mint leaves, cinnamon, apple cider vinegar and lemon juice with 0.5% wheatgrass was a more effective blend in terms of acidity (1.89 – 2.11) and Vitamin – C (2.6mg). Sensory evaluation was also higher with a better consistency score up to the end of storage. On the basis of the above results revealed in the present study it may be concluded that the formulation of the mixed blend detox drink is perfect to satisfy consumer taste and preferences. The product was shelf life stable only for 5 days of storage. So the juice blend is better to be consumed within 3 days for good acceptability. Therefore, water alone is not effective in the flushing of toxins from the body while other added natural ingredients also aids in the weight loss and in keeping of the organs healthy by the detoxification process.

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