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Studies on physico-chemical properties of papaya blended aloe vera based health drink

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Abstract

Aloe vera (*Aloe barbadensis* Miller) is a medicinal plant with therapeutic application. It has an anti-inflammatory, antioxidant, antimicrobial and immune boosting properties. Aloe vera has medicinal properties due to which it is used in present work for preparation of health drink i.e., RTS (Ready To Serve) in combination with papaya (*Carica papaya*) which is a rich source of nutrients and also contains powerful antioxidant Vitamin C. RTS was prepared by adding jaggery, a traditional sweetener having higher nutritional value as compared to sugar. Health drink was prepared by using different proportions of aloe vera and papaya such as 90:10, 80:20, 70:30, and 60:40. Among which combination of aloe vera and papaya having proportion of 60:40 was selected as the best sample on the basis of sensory evaluation. It helps in maintaining good health due to its nutritional and antioxidant properties.

Keywords: health drink, aloe vera, papaya, jaggery, RTS, antioxidant

1. Introduction

Fruit juices and functional beverage sector has been reported to be fastest growing segment. Healthy beverages provide functional ingredients such as minerals, antioxidants so new product development in the health drink and fruit juices are increasing in demand and are being preferred by the health conscious consumers. (Ramachandran P. and Nagarajan S., 2014) [8].

Aloe vera (*Aloe barbadensis* Miller) is from liliacea family. Aloe vera gel is colourless and contains water, acemannan and glucomannan. Acemannan is the main component. Glucomannan also plays important role in wound healing, stimulating the immune system. It also has antibacterial, antiviral effect. Aloe vera gel is used to treat constipation, coughs, ulcers, diabetes, headaches, arthritis, and immune-system deficiencies. (Bozzi A. *et al.*, 2007) [5].

Papaya fruit (*Carica papaya*) contains vitamin C, vitamin A, vitamin E and vitamin B; minerals like magnesium and potassium. It is rich in beta carotene and also good source of folate and fiber. Papaintha is digestive enzyme present in the papaya fruit which is effective to treats allergies, sports injuries and trauma. Papaya is helpful to improve cardiovascular system and prevents colon cancer. (Aravind. G., *et al.*, 2013) [4].

Jaggery has higher nutritional value as compared to sugar. It contains natural minerals and vitamins. It releases glucose sweetener slowly as compared to refined sugar. (Gangwar L.S. *et al.*, 2015) [6].

2. Materials and Methods

2.1 Raw Material

The materials used for the preparation of RTS were Aloe vera leaves, Papaya and Jaggery. Aloe vera leaves were collected from botanical garden of Shivaji University, Kolhapur. Papaya and jaggery were purchased from local market of Kolhapur and all the preliminary treatments like washing, peeling, cutting, chopping and grinding were done in college lab.

2.2 Aloe vera Juice

Freshly picked leaves were washed with cold tap water then hand filleting done, aloe vera gel obtained. Aloe vera gel washed with water. Then gels were grinded through domestic mixer and then filtered through muslin cloth to get aloe vera juice.

2.3 Papaya Juice

Papaya washing was done with tap water and then peeling was carried out with the help of hand peeler. It was cut into pieces and pulping was done in domestic mixer. The pulp was filtered with the help of muslin cloth and papaya juice was obtained.

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2.4 Method for preparation

Juices of aloe vera, papaya were blended as per different formulations such as 90:10, 80:20, 60:40, 50:50 and 40:60 respectively. On the basis of sensory evaluation sample containing aloe vera and papaya blend (60:40) was selected. Jaggery and citric acid were added to the prepared drink as per FPO specifications. Then the prepared juice was filtered with the help of a muslin cloth. The health drink was filled in washed and pre-sterilized glass bottles. They were sealed with the help of crown corking machine. After that bottles were pasteurized at 85 °C for 30 seconds. Then they were cooled and stored at refrigeration temperature.

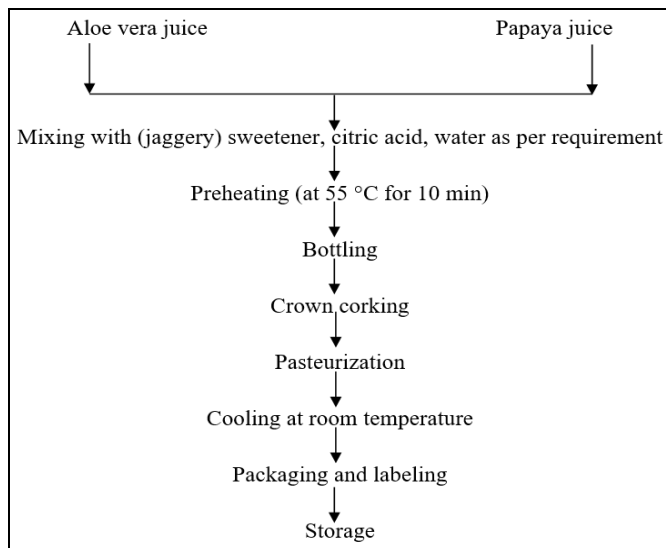


Fig 1: Flow chart showing process details (Srivastava *et al.*, 2002)

2.5 Physico-Chemical composition

Percent acidity was determined by titrating against 0.1N NaOH according to A.O.A.C method (A.O.A.C. 2000) [3] while vitamin C was determined by titration method using 2, 6-dichlorophenol endophenol dye (Rangana 1986) [9]. TSS was measured by using hand refractometer (0-32° Brix) and pH was measured using pH meter (A.O.A.C. 2000) [3]. Moisture, Ash, Fat was calculated using (A.O.A.C. 2000) [3] method. Protein was analyzed by Kjeldal method using 6.25 conversion factor. Total carbohydrates were determined by using anthrone method (Rangana 1986) [9]. Mineral contents were analyzed by atomic adsorption spectroscopy method described by (Adelekan A.O., *et al.*, 2014) [11]

2.6 Determination of radical scavenging activity (Antioxidant Activity)

Health drink was analyzed for free radical scavenging activity. The total antioxidant property of health drink was determined by method described T. Kathiravan (2015) [7] method by using 2, 2-Diphenyl-1-picrylhydrazil radical (DPPH) in terms of % radical scavenging activity. DPPH solution (1 mg/ml) was made by dissolving DPPH in methanol. DPPH solution (100 µl) was diluted to 5 ml and absorbance was taken at 535 in UV-Spectrophotometer. The absorbance was taken as control absorbance. The extract (100µl) was made by dissolving required health drink in methanol; then it was added with 100µl of 1mg/ml of DPPH solution. Then it was diluted to 5 ml by methanol then it was incubated at room temperature for 30 minutes. Then absorbance was measured at 535 nm in UV spectrophotometer. The absorbance was taken as sample absorbance. Following formula was used to calculate the

antioxidant activity. (Kathiravan T. *et al.* 2015) [7]

$$\% \text{ inhibition of DPPH} = \frac{(A_{\text{blank}} - A_{\text{sample}})}{(A_{\text{blank}})} \times 100$$

2.7 Sensory analysis

Sensory evaluation was carried out by semi trained judges using 9-point hedonic scale. Evaluation was done in terms of properties such as Color, Flavour, Clarity and Taste. Overall acceptability score was calculated as average of whole sensory attributes (Rangana 1986) [9].

3. Results and Discussion

3.1 Proximate analysis of raw material

3.1.1 Aloe vera juice

Proximate composition of aloe vera juice such as moisture content, ash, protein, and fat shown in table no. 1

Table 1: Proximate composition of Aloe vera juice

Components	Values
Moisture (%)	98.24±0.11
Ash (%)	0.17±0.01
Protein (%)	0.12±0.01
Fat (%)	0.00
Crude fiber (%)	0.13±0.01
TSS	1.1-2.1
Acidity (%)	0.23±0.03
pH	3-4.5

Sample was taken in triplicates and values shown in table no. 1 are mean and ± standard deviation.

3.1.2 Papaya juice

Proximate composition of papaya juice such as moisture content, ash, protein, and fat shown in table no. 2

Table 2: Proximate Composition of papaya juice

Components	Values
Moisture (%)	94.52±0.45
Ash (%)	0.43±0.11
Protein (%)	0.39±0.03
Fat (%)	0.26±0.01
Crude fiber (%)	0.2±0.01
TSS	12-14
Acidity (%)	0.223 ± 0.01
pH	4.2-5

Sample was taken in triplicates and values shown in table no. 2 are mean and ± standard deviation.

3.2 Physico-chemical analysis of health drink

In research work it was found that protein content was in the range of 0.78% and Vitamin C 12mg/100ml. It contains antioxidants 10.49% and it is also rich source of minerals like calcium (35.58 mg/100ml) and iron (1.1073 mg/100ml).

Table 3: Physico-chemical Composition of prepared health drink

Components (%)	Value
Protein (%)	0.78 ± 0.02
Ash (%)	0.008 ± 0.001
Vitamin-C(mg/100ml)	12 ± 0.40
TSS (°Brix)	12±0.40
Acidity (%)	0.35±0.30
pH	4.5
Total sugar (%)	9.6 ± 0.80
Antioxidants (%RSA)	10.72 ± 0.83
Calcium (mg/100ml)	35.589
Iron (mg/100ml)	1.1073

Sample was taken in triplicates and values shown in table no. 3 are mean and ± standard deviation.

3.3 Sensory Analysis

Five blends were prepared for the sensory analysis and analyzed by 9-point hedonic scale. Results obtained are

shown in the table no. 4 and average sensory analysis data is shown in figure no. 2.

Table 4: Sensory attributes of health drink

Sample	Appearance	Taste	Flavour	colour	Overall Acceptability
AP1(90:10)	7.5	7.4	7.3	7.6	7.9
AP2(80:20)	7.5	7.0	7.3	7.9	7.9
AP3(70:30)	7.9	7.5	7.7	8.0	7.8
AP4(60:40)	8.5	8.0	8.2	9.0	8.5
AP5(50:50)	7.5	7.7	7.7	8.0	7.5

Score was between 1-9 as per liking.

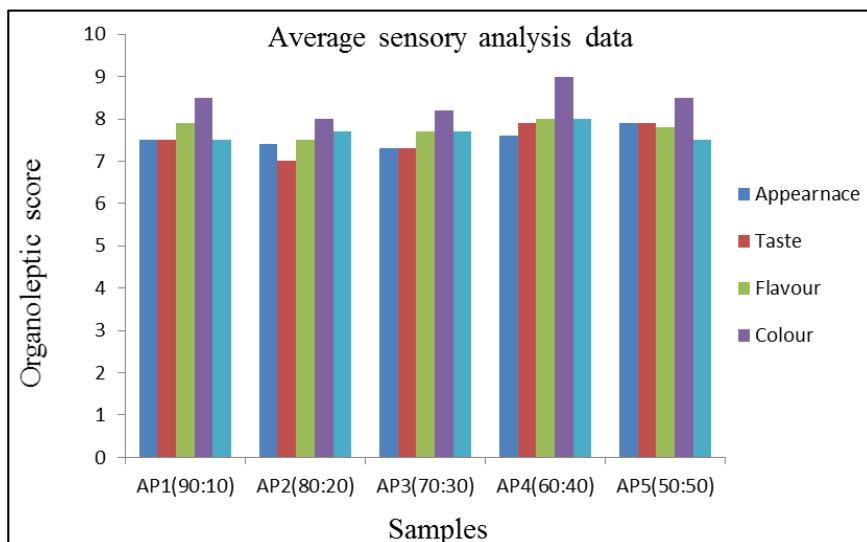


Fig 2: Average sensory analysis data

It is clear from figure no. 2 that sample AP 4 was most acceptable than other samples as per analyzed by panel members in terms of appearance, taste, flavour, colour and overall acceptability.

4. Conclusion

It was found from the sensory evaluation that sample AP 4 was the best among the 5 samples. AP4 contains proportion of Aloe vera: Papaya as 60:40 respectively. Proximate analysis showed that sample AP4 contains (0.78%) protein, (12mg/100ml) vitamin C, (9.6%) total sugar, (10.72% RSA) antioxidants, (35.589 mg/100ml) calcium and (1.1073 mg/100ml) iron. Thus, the prepared health drink can be beneficial for the people and can be commercialized to fulfill the demand of nutritional RTS drink.

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