Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; SP3: 372-375

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National conference on "Conservation, Cultivation and Utilization of medicinal and Aromatic plants"
(College of Horticulture, Mudigere Karnataka, 2018)

Development of karonda, shatavari and aloevera based blended health drink

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Abstract
The health drink ready to serve (RTS) beverage was prepared from karonda, shatavari and aloevera. The blended RTS was prepared using extracted juices from karonda, shatavari and aloevera in the ratios of 100:0:0, 50:50:0, 50:45:05 and 50:40:10, respectively with two levels (15 and 20 %) of final juice content in RTS. The blends were homogenized and filled into 200 ml sterilized glass bottle and pasteurized at 85 °C for 10 minutes, cooled and stored at ambient temperature. The physicochemical and sensory parameters of health drinks were analyzed. Among the different combinations, karonda juice based health drink prepared with 15 per cent juice blend of 50 per cent karonda + 45 per cent shatavari + 5 per cent alovera juice was found highly acceptable with respect to flavour, taste and overall acceptability.

Keywords: health drink, karonda, shatavari, aloe vera

Introduction
Karonda (*Carissa carandas* L.) popularly known as "Christ's thorn" is an underutilized minor fruit crop of India. Fruits are harvested at both mature and ripe stage depending on their use. The unripe fruit is sour, astringent, bitter, thermogenic, constipating, aphrodisiac, appetizer, antipyretic, hyperdipsia, diarrhoea, anorexia and intermittent fevers. The fruits are rich in protein (1.12-2.25%), vitamin C (1.6-17.9 mg/100g) and minerals especially iron (39.1mg/100g), calcium (21 mg/100g) and phosphorus (38 mg/100g) (Kumar and Singh, 1993) [10]. The ripe fruit is sweet in taste with peculiar aroma, dark brown to purple in colour and it has cooling effect, good appetizer and antiscorbutic. It is also useful in burning sensation, skin diseases and scabies. The fruits may be eaten as a dessert when ripe or used in the preparation of fruit products such as squash, candies, jelly and chutney (Shaheel *et al.*, 2015) [15].

Asparagus racemosus belonging to the family Liliaceae, is popularly known as "Shatavari" is an indigenous medicinal plant used in Sidha and Homeopathy medicines. Shatavari roots are used mainly as galactagogue which stimulates the secretion of breast milk. It is applied to improve the lost body weight and also known as an aphrodisiac. The roots are used in treating the ailments like dysentery, tuberculosis and diabetes. It is considered as very good energy provider to the weak body system (Ravindra, 2012) [11]. The root of Shatavari contains protein 22 per cent, fat 6.2 per cent, carbohydrates 3.2 per cent, vit B 0.3 per cent, vitamin C 0.04 per cent and other alkaloids. Besides quenching thirst its root juice helps in cooling the body in the summer, curing hyper acidity and peptic ulcers (Anonymous, 1952) [2].

The *Aloe vera* of Aloeceae family is one of the most popular naturally occurring medicinal plants with superb therapeutic uses (Saroja *et al*., 2004) [12]. The active principle of aloe is a mixture of glycosides called aloin which is a glucoside of aloe emodin. The leaf of aloe is treasure house of vitamins,minerals, enzymes, amino acids, sterols and anthroquinones. Aloe juice consists of 99.5 per cent moisture, 0.026 per cent reducing sugars, 0.19 per cent total sugars, 0.013 per cent proteins, 0.2 per cent fiber, 26 mg magnesium, less than 0.001 per cent of heavy metals and pH of 4 to 5 (Chandegara and Varshney, 2005) [5]. The *Aloe vera* juice

Have wide application in food products like production of ready to serve drinks, health drink, *Aloe vera* lemon drink, sherbet, aloe sports drink with electrolyte, diet drink etc.

In the past few years, high consumption of soft drinks has attracted negative attention world-wide due to its possible adverse effects, leading the health conscious among the people to find alternative nutraceutical or herbal health drinks (Garg and Ahuja, 2015) [6]. The blending of fruit juices could be an economic requisite to utilize some varieties of fruits for processing, which may not otherwise have favourable characters such as colour, aroma, mouth feel including overall cost for the preparation of the processed products. It may also enhance the appearance, nutrition, flavour of the product and lead to new product development (Kalra *et al.*, 1991) [9]. Similarly, blending of fruit juices along with medicinal herbs like shatavari, aloevera, mint *etc.* can lead to the development of health drinks with increased nutritional and medicinal value of the juices. These drinks are rich in nutritional and pharmacological properties and could be useful to combat the malnutrition and hidden hunger among the people in the region, where there is scarcity food (Hossain *et al*., 2017) [7].

Keeping in view of the nutritive and health benefits of karonda, shatavari and aloe vera, the present investigation has been taken to study the optimization of karonda, shatavari and aloe vera juice for the development of blended health drinks with desirable characteristics.

Material and Methods

Extraction of Karonda Juice

The fruits were procured from local market of Gokak. The procured fruits were sorted and washed using clean water containing 0.1 per cent salt solution for surface sterilization. The fruits were then put into blender and the pulp was sieved using double fold muslin cloth to collect juice.

Juice extraction from Alovera

The fresh leaves of aloe vera were collected from Department of PSMA, KRC College of Horticulture, Arabhavi. The washed fresh leaves of aloevera were scooped out to separate the gel fillet and fillets were soaked in water for overnight. The soaked fillets were then pulped in the mixer, then filtered through muslin cloth and the clear juice was obtained.

Juice extraction from Shatavari

The fresh roots of shatavari were collected from Department of PSMA, KRC College of Horticulture, Arabhavi. The shatavari roots separated from the stems were thoroughly washed under running water, peeled and the juice was extracted by blending of cut roots in blender.

Preparation for Blended health drinks

RTS was prepared using extracted juices from karonda, shatavari and aloe vera. From treatment T_1 to T_4, RTS with 15 per cent juice was prepared from karonda, shatavari and aloevera juice by blending them in the ratio of 100:0:0, 50:50:0, 50:45:05 and 50:40:10, respectively. From T_5 to T_8, RTS with 20 per cent juice was prepared by blending karonda, shatavari and aloevera juice in the ratio of 100:0:0, 50:50:0, 50:45:05 and 50:40:10, respectively. The final TSS was adjusted to 15^0B in all the treatments by adding sugar.

Table 1: Different formulation ratios of karonda, shatavari and aloevera based blended health drink

T_1 – Juice 15 % (100% karonda juice)
T_2 – Juice 15 % (Blend of 50 % karonda + 50% Shatavari)
T_3 – Juice 15 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T_4 – Juice 15 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice)
T_5 – Juice 20 % (100% karonda juice)
T_6 – Juice 20 % (Blend of 50 % karonda + 50% Shatavari)
T_7 – Juice 20 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T_8 – Juice 20 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice)

Physico-Chemical Analysis

The qualitative parameters such as, TSS (Erma hand refractometer), titrable acidity, ascorbic acid content (Anon., 1984) [3], reducing sugars, non-reducing sugars and total sugars (Somogyi, 1952) [16] were measured for the freshly prepared karonda, shatavari and aloe vera based blended health drink.

Organoleptic evaluation

Organoleptic evaluation of freshly prepared blended RTS from fruits and medicinal crops were carried out. The products were evaluated for acceptability using organoleptic score (i.e., color, flavor, mouth feel, taste and overall acceptability) by adopting a nine-point hedonic scale (Amerine et al., 1965) [1]. Organopletic evaluation was carried out by a semi-trained test panel consisting of teachers and post- graduate students of KRC College of Horticulture, Arabhavi on a nine point hedonic scale using the score card (1=dislike extremely and 9 = like extremely).

Statistical analysis

The data on the physico- chemical parameters and organoleptic characters recorded in were subjected to completely Randomized Design analysis.

Results and Discussion

In the present investigation, the karonda juice extracted from the fruits was blended with shatavari and aloevera juices at different proportions. 15 and 20 per cent juice containing RTS prepared in 8 treatment combinations consisting of juice blends of karonda, shatavari and aloevera in the ratio 100:0:0, 50:50:0, 50:45:05 and 50:40:10 was evaluated for physico-chemical and organoleptic evaluation (Table 1). Titratable acidity, ascorbic acid, reducing sugars, non reducing sugars and total sugars were found in the range of 0.22 to 0.48 per cent, 11.72 to 8.41 mg/ 100 ml, 3.28 to 5.10 per cent, 21.68 to 23.72 per cent and 26.25 to 29.57 per cent, respectively (Table 2). Organoleptic scores for RTS varied from 7.44 to 6.24 for colour and appearance, 7.33 to 6.11 for flavour, 7.78 to 6.17 for taste and 7.63 to 6.19 for overall acceptability (Table 3).

From Table 2 it was evident that, RTS prepared from 20 per cent juice of 100 per cent karonda juice recorded highest titratable acidity (0.53%), ascorbic acid (11.72mg/110g), reducing sugars (5.10%) and total sugars (29.57%). The higher amounts might be due to higher sugar content and

acidity in karonda when compared to aloevera and shatavari. Non-reducing sugars (23.72%) was found to be highest in T_1 – Juice 15 % (100% karonda juice). Similar reports were found in blended RTS prepared from aloevera and pineapple (Sasikumar and Vivek, 2015) [13] and RTS prepared by blending papaya and aloevera (Boghani *et al.*, 2012) [4].

Organoleptic quality characteristics of blended RTS beverage (Table 3) were determined on 9 point hedonic scale. The treatment T_8 – Juice 20 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice) recorded highest score for colour and appearance (7.44). For flavour (7.33), taste and mouth feel (7.78 each), T_3 – Juice 15 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice) recorded highest score. Similar findings were reported by Ravindra *et al.* (2012) [11] in shatavari blended nectar and Tiwari and Deen (2015) [17] in bael and aloevera blended RTS.

Table 2: Chemical composition of karonda, shatavari and aloevera based blended health drink as influenced by treatments

Treatments	TSS (^{0}B)	Titratable acidity (%)	Ascorbic Acid (mg/100g)	Reducing sugars (%)	Non-reducing sugars (%)	Total sugars (%)
T_1	15	0.48	9.43	4.97	23.72	29.45
T_2	15	0.35	9.17	4.48	22.54	28.70
T_3	15	0.27	9.15	3.28	21.82	26.25
T_4	15	0.24	10.45	3.54	21.72	26.40
T_5	15	0.53	11.72	5.10	23.25	29.57
T_6	15	0.37	10.70	4.68	22.36	28.22
T_7	15	0.22	10.68	3.78	21.68	26.60
T_8	15	0.32	8.41	3.36	21.79	26.29
Mean		0.35	9.96	4.15	22.36	27.69
S Em ±		0.06	0.33	0.03	0.10	0.11
C D(0.01)		NS	1.35	0.13	0.42	0.44

NS non-significant
T1 – Juice 15 % (100% karonda juice)
T2 – Juice 15 % (Blend of 50 % karonda + 50% Shatavari)
T3 – Juice 15 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T4 – Juice 15 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice)
T5 – Juice 20 % (100% karonda juice)
T6 – Juice 20 % (Blend of 50 % karonda + 50% Shatavari)
T7 – Juice 20 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T8 – Juice 20 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice**)**

Table 3: Organoleptic scores of karonda, shatavari and aloevera based blended health drink as influenced by treatments

Treatments	Color and appearance	Flavor	Mouth feel	Taste	Overall acceptability
T_1	6.24	6.89	7.00	6.83	6.97
T_2	6.28	6.11	6.17	6.39	6.19
T_3	7.33	7.33	7.78	7.78	7.63
T_4	7.33	6.94	7.06	6.94	7.14
T_5	6.39	6.11	6.61	6.17	6.56
T_6	6.44	6.72	7.17	7.06	6.89
T_7	6.56	6.56	7.28	7.33	6.81
T_8	7.44	6.33	6.94	7.00	6.67
Mean	6.75	6.63	7.00	6.94	6.86
S Em ±	0.18	0.18	0.49	0.25	0.16
C D(0.01)	0.75	0.76	NS	1.02	0.67

NS non-significant
T1 – Juice 15 % (100% karonda juice)
T2 – Juice 15 % (Blend of 50 % karonda + 50% Shatavari)
T3 – Juice 15 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T4 – Juice 15 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice)
T5 – Juice 20 % (100% karonda juice)
T6 – Juice 20 % (Blend of 50 % karonda + 50% Shatavari)
T7 – Juice 20 % (Blend of 50 % karonda + 45% Shatavari + 5 % Alovera juice)
T8 – Juice 20 % (Blend of 50 % karonda + 40% Shatavari + 10 % Alovera juice)

Conclusion

Karonda juice based health drink prepared with 15 per cent juice blend of 50 per cent karonda + 45 per cent shatavari + 5 per cent alovera juice was found to be highly acceptable with respect to flavour, taste and overall acceptability.

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