



DEVELOPMENT OF POTASSIUM RICH FRUIT BEVERAGE

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ABSTRACT

The present research study conducted with an objective to develop potassium rich fruit beverage. The beverage was prepared by using different extract of vegetable and fruits such as black grape, carrot, tulsi, lemon and soy whey, five treatments of Ready to serve drink were prepared. Those were in the form of control, treatment T₁, treatment T₂, treatment T₃ and treatment T₄. The highest potassium content was recorded in T₄ (222 mg/100g) however, on the basis of nutritional and organoleptic evaluation treatment T₂ (soy whey 20%, carrot juice 15%, black grape juice 50%, tulsi extract 3%, lemon extract 1% and honey 10 %), potassium content (154.15 mg/100gm) was found satisfactory.

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INTRODUCTION

Many people suffering from malnutrition due to inadequate and imbalance diet. The daily per capita fruit requirement is about 250-300g but the availability may not be enough due to various reasons. There are many synthetic drinks available in the market which contains water, acidulants, flavorings, food colors, preservatives etc as major ingredient (Ashurst, 1998). Fruit based drink contains different vitamins and minerals. The consumer attracted fruit based drink. The market for nutritional drinks is expected to expand further due to the trend toward lifestyle diseases (McCoy, 2005). Fruit based drinks contains fruit juice or mixture of fruits juices, which is free from alcohol and also balancing sweetness and acidity.

The grape (*Vitis*) is one of the popular and widely cultivated fruits in the world. Grape phytochemicals from the skin, seed, and juice, have been identified as carotenoids, melatonin, and phenolics. These phytochemicals are not only antioxidant, anticancer, anti-inflammatory, LDL-cholesterol oxidation and platelet aggregation lowering, anti-platelet, estrogenic, anti-apoptotic, and antimicrobial; all functions which are beneficial to health, but they are also cardio-protective, neuro-protective, hepato-protective, and inhibit age-related cognitive decline. Grapes are using as fresh fruit (table grape) and processed fruit such as jam, grape juice, jelly, molasses, and raisins). Grapes, considered as a rich source of polyphenolic compounds, have tremendous potential for use in the development of such products (Threlfall *et al.*, 2005).

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Grape is a rich source of potassium. Potassium is an essential nutrient needed for maintenance of total body fluid volume, acid and electrolyte balance, and normal cell function. Normally, most ingested potassium is excreted via the urine. Under conditions of extreme heat and intense physical activity that result in a high sweat production, potassium losses in sweat are increased and appreciable. However, acclimation occurs rapidly, and potassium losses via sweat are reduced quickly. Thus, most individuals can replace needed potassium through food consumption with the need for supplements or specially formulated products. Potassium is commonly found in a variety of unrefined foods, especially fruits and vegetables.

Carrot (*Daucus carota* L.) is an essential root vegetable commonly used in the diet of human beings. It is greatly treasured as food mostly because it is the best source of carotene; a precursor of Vitamin A. Carrot is a good source of dietary fiber and of the trace mineral molybdenum, rarely found in many vegetables. Molybdenum aids in metabolism of fats and carbohydrates and is important for absorption of iron. It is also a good source of magnesium and manganese. Magnesium is needed for bone, protein, making new cells, activating B vitamins, relaxing nerves and muscles, clotting blood, and in energy production. Insulin secretion and function also require magnesium. Manganese is helpful in carbohydrate metabolism, in coordination with enzymes in the body. Manganese is used by the body as a co-factor for the antioxidant enzyme, superoxide dismutase. Potassium and magnesium in carrots help in functioning of muscles.

The term “whey” refers to a complex substance that is separated from the liquid and made up of a combination of

protein, lactose, minerals, immune globulins and trace amounts of fat. Soy whey is known as a complete protein that is fast and easy to digest. Very low in fat, so it contains no cholesterol and contains phytochemicals.

The essential oils found in tulsi, effectively act on our respiratory system. It is rich in antioxidants which help in mitigating stress and conditions like diabetes, high blood pressure. High-quality honey contains many important antioxidants. These include phenols, enzymes and compounds like flavonoids and organic acids. Honey has anti-inflammatory, immune boosting property, and exhibits broad spectrum antibacterial activity. It also poses prebiotic effects and promotes health of gastrointestinal tract.

There is a big market for fruit based nutritional drinks due to avoidance of the general synthetic beverage by the consumer from the stand point of health and nutrition. Ohki et al. (2004) suggested that the market for nutritional or health drinks is expected to expand further due to the aging of the population and the trend toward lifestyle changes.

The research aims to develop the technology for potassium rich fruit beverage and to improve food quality by creating products hypoglycaemic or, especially this study associated with sugar-free beverage with real benefits on consumer's health.

MATERIALS AND METHODS

The present study entitled "Development of Potassium Rich Fruit Beverage" was carried out in Regional Food Research And Analysis Centre (RFRAC) Lucknow, U.P. Black grapes, carrots, soybean, cardamom, tulsi, lemon, honey, was taken from the local market of Lucknow.

Table 1 Composition of raw ingredients for control and treated beverage

Ingredients	Treatments				
	Control	T1	T2	T3	T4
Soy whey (ml)	20	20	20	20	20
Black Grape Juice (ml)	30	40	50	60	70
Carrot juice (ml)	-	10	15	20	25
Honey (ml)	10	10	10	10	10
Cardamom (gm)	0.3	0.3	0.3	0.3	0.3
Tulsi (ml)	1	2	3	4	5
Lemon (ml)	1	1	1	1	1

Analysis for biochemical parameters

The biochemical parameters (moisture, ash, protein, carbohydrate, energy, TSS, titratable acidity, pH, vitamin-C, calcium, total sugar, potassium content and organoleptic evaluation of the beverage were determined according to the FSSAI Manual.

RESULTS & DISCUSSION

The physico-chemical characteristics are presented in table.1. The highest mean for moisture content was recorded in treatment T₃ (84.18), followed by T₂ (83.77), T₄ (83.34), T₁ (82.72) and control (76.38). The maximum content of ash was found in treatment T₂ (0.23), and minimum in treatment control (0.03). The highest content of fat were recorded in treatment Control (8.72), and lowest in treatment T₄ (0.97), and thus. The maximum protein content were recorded in treatment T₄ (0.81), followed by T₁ (0.75), T₂ (0.74), and control (0.66). The highest mean for carbohydrate were recorded in treatment T₄ (14.56), and minimum was in treatment T₁ (8.02). The maximum Energy content was

recorded in treatment Control (137.95), followed by T₁ (105.26), T₂ (74.49), T₄ (70.25) and T₃ (67.55). The range of T.S.S. was recorded from 16.5 to 23.7⁰ brix. The range of titratable acidity recorded from 0.30 to 0.33. The range of pH was observed from 3.97 to 4.32. Vitamin C content was recorded maximum in treatment T₃ (9.25), followed by T₁ (9.09), T₂ (7.80), control (5.77) and T₄ (4.57). The highest calcium content was recorded in treatment T₃ (152.66) and minimum in treatment control (117.32). The maximum Total sugar content was recorded in treatment Control (27.58) followed by T₁ (13.14), T₃ and T₄ (11.90), and T₂ (10.91). The maximum potassium content was recorded in treatment T₄ (222.00) followed by T₃ (185.48), T₂ (154.15) and T₁ (111.68).

Table 2 Biochemical evaluation of Potassium rich Fruit beverage

S.No	Parameters	Treatments				
		Control	T ₁	T ₂	T ₃	T ₄
1.	Moisture%	76.38	82.72	83.77	84.18	83.34
2.	Ash%	0.03	0.19	0.23	0.21	0.17
3.	Fat%	8.72	8.20	2.10	1.03	0.97
4.	Protein%	0.66	0.75	0.74	0.65	0.81
5.	Carbohydrates%	14.22	8.02	13.16	13.93	14.56
6.	Energy K Cal/100gm	137.95	105.26	74.49	67.55	70.25
7.	T.S.S. ⁰ brix	23.7	18.9	18.7	16.2	16.5
8.	Acidity%	0.31	0.32	0.32	0.30	0.32
9.	pH	4.21	3.97	4.22	4.32	4.15
10.	Vitamin C mg/100gm	5.77	9.09	7.80	9.25	4.57
11.	Calcium mg/100gm	117.32	150.83	133.53	152.66	146.90
12.	Total Sugar%	27.58	13.14	10.91	11.90	11.90
13.	Potassium (mg/100g)	60.31	111.68	154.15	185.48	222.00
	Parameters	Microbial Treatments				
13.	Total Plate Count (cfu/ml)	Control	T ₁	T ₂	T ₃	T ₄
		8x10 ¹	7.9 x10 ¹	16.8 x10 ¹	20.8 x10 ¹	25.2 x10 ¹
14.	Yeast and Mould (cfu/ml)	3.9 x10 ²	3.5 x10 ²	3.0 x10 ²	2.5 x10 ²	2.0 x10 ²

CONCLUSIONS

Potassium rich fruit juice based on (soy whey, black grapes extract, carrot extract, tulsi extract, lemon, cardamom powder and honey), which provide several health benefits. It also contain nutritional benefits of soy beans and soy protein rich foods. The present study shows that blended soy whey based beverage incorporated with black grapes extract, carrot extract, tulsi extract, lemon, cardamom powder and honey which could enhance nutritional quality of soy whey drink and development of the new product. According to the nutritional and organoleptic analysis, treatment T₂ is found to be satisfactory. It can lead successfully for future food processing industries.

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