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Blending quality of mint and orange based nutritious herbal beverages

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Abstract

It is concluded that organoleptically orange and celery drink was most acceptable in the proportion of 78ml of fruit juice, 20ml of celery juice and 2ml of mint extract, of celery juice and 2ml of mint extract was added was most acceptable and celery drink, was most acceptable in the proportion of 72ml of the fruit juice, 20ml of the celery juice and 8ml of the mint extract. Carotene, iron and calcium contents increased in the treated samples of all the three beverages as compared to control. Vitamin-C content also increased in the treated samples of the beverages as compared to the control except in orange and celery beverage where it decreased. Total carbohydrate content decreased in the treated samples of all the three beverages as compared to the respective controls. Natural sweetener Stevia was used in the beverages instead of sugar, which lowered the calorie content. Addition of herbal extracts not only increased the nutritional contents but also added variety in the choice of beverages.

Keywords: celery juice, fruit pulp, stevia and mint extract, acceptability, 9 point Hedonic Scale

Introduction

Today, there is much confusion about the impact of some beverages and ingredients on health. However, most nutrition experts like the Academy of Nutrition and Dietetics agree that it's the total diet and overall pattern of food eaten, rather than any one food or meal that is important. All foods and beverages can fit into a sensible, balanced diet that is nutritionally adequate, calorically appropriate, and that is combined with regular physical activity. Many people go through various efforts to stay fit, maintain good health, and ensure their longevity. Examples of these practices include engaging in rigorous physical fitness training, eating a balanced and healthy diet, maintaining ideal weight and employing an effective stress management procedure. It is also important to stop smoking, reduce alcohol intake and avoid the use of prohibited substances.

A person's health is a very important aspect of his life - "*health is wealth*". For most human beings, staying fit and healthy is parallel to being wealthy, for a person's everyday life is influenced mainly by the state of his mind and body, especially by the presence and absence of certain diseases.

Poor health can be caused by a host of different factors, such as poor eating habits, lack of exercise, stress and excessive smoking and alcohol intake. Unbalanced intake of nutrients, for one, may cause excessive or deficient nutrient intake, which will definitely affect the body's normal functions. These nutrients are necessary for a person's growth, metabolism and other functions. There are six main nutrients that are needed by the human body in different amounts to perform its various processes. These are: carbohydrate, protein, fats, vitamins, minerals, water.

Celery has always been associated with lowering of blood pressure. When combined with other juices, it provides different formula that helps other conditions. Celery leaves have a high content of vitamin A, whilst the stems are an excellent source of vitamins B₁, B₂, B₆ and C with rich supplies of potassium, folate, calcium, magnesium, iron, phosphorus, sodium and plenty of essential amino acids. In addition to well-known antioxidants like vitamin C and flavonoids, scientists have now identified at least a dozen other types of antioxidant nutrients in celery. The antioxidant support we get from celery is largely due to its phenolic nutrients that have been shown to help protect us against unwanted oxygen damage to our cells, blood vessels, and organ systems. Celery juice is a natural remedy for reducing blood cholesterol levels in our body. It contains a chemical compound named 3-n-butylphthalide that has positive effects on reducing the bad cholesterol in our body (low density lipoprotein). It also boosts the secretion of bile or steroid acids which is helpful in lowering cholesterol too. The

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juice extracted only from two stalks of celery can decrease our cholesterol levels up to 7 points. Celery juice is effective against various other disorders like cancer, high blood pressure, insomnia and inflammatory disorders.

Materials and Methods

The present study entitled “Formulation of fruit based nutritious beverages incorporating celery and mint, using a natural sweetener” was conducted in the Nutrition Research Laboratory of Foods & Nutrition Department, Ethaline School of Home Science, Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad, and U.P.

1. Procurement of raw materials:-

Celery stalks and cherry tomatoes were purchased from the super-market of Allahabad.. Stevia powder was obtained from the nearby pharmacy.

2. Site of experiment

The present investigation was carried out in the Nutrition Research Laboratory of the Department of Foods & Nutrition, Ethaline School of Home Science, Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad.

3. Formulation of beverages

Three fruit based nutritious herbal celery beverages was prepared using different fruits in different herbal proportions.

- Orange and celery juice with mint.

Treatment and replication of the formulation of fruit based herbal beverage

Treatment	Fruit juice/pulp (ml)	Celery juice(ml)	Sugar (gm)	Mint extract (ml)	Stevia (mg)
T ₀	100		20		
T ₁	78	20		2	17.5
T ₂	76	20		4	17.5
T ₃	74	20		6	17.5
T ₄	72	20		8	17.5

- Preparation of orange juice:-

Oranges



Fig: Flowchart for preparation of orange juice (Source: Srivastava 2009)

Preparation of the beverage

Take celery juice as per treatment amounts

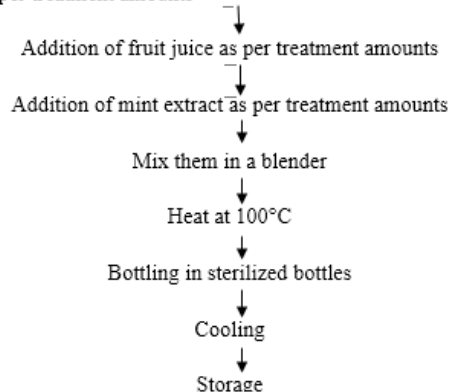


Fig: Flowchart for preparation of beverage (Source: Srivastava 2009)

Treatments and replications of value added food products enriched with fruit juice, celery juice and mint were as follows:-

➤ **Treatment of products**

The basic fruit beverage with sugar (20gm) was served as control (T₀) for each product. Four value addition treatments were done with celery juice (20ml), mint extract at 2ml, 4ml, 6ml and 8ml were referred to as T₁, T₂, T₃ and T₄ respectively. The amount of fruit juice was varied at each treatment at 78ml, 76ml, 74ml and 72ml in accordance to all the four treatments. The amount of Stevia was kept constant at 17.5mg for all the products prepared, namely, Orange based celery beverage with mint. Control and treatments for each preparation were replicated 4 times respectively.

Table of treatments of products Orange and celery beverage

Treatments	T ₀	T ₁	T ₂	T ₃	T ₄
Products					
Orange juice	100ml	78ml	76ml	74ml	72ml
Celery juice	---	20ml	20ml	20ml	20ml
Mint extract	---	2ml	4ml	6ml	8ml
Sugar	20gm	---	---	---	---
Stevia powder	---	17.5mg	17.5mg	17.5mg	17.5mg

Determination of Total Carbohydrate

Principle

Carbohydrates are first hydrolyzed into simple sugars using dilute hydrochloric acid. In hot acidic medium glucose is dehydrated to hydroxymethyl furfural. This compound forms with anthrone a green colored product with an absorption maximum at 630 nm.

Materials

- 2.5 N HCl
- Anthrone reagent: Dissolve 200 mg anthrone in 100 ml of ice-cold 95% H₂ SO₄. It should be prepared fresh before use.
- Standard glucose: Stock—Dissolve 100 mg in 100 ml water. Working standard—10 ml of stock diluted to 100 ml with distilled water. Store refrigerated after adding a few drops of toluene.

Calculation

Amount of carbohydrate present in 100 ml of the sample

$$= \frac{\text{mg of glucose} \times 100}{\text{Volume of test sample}}$$

Determination of Beta-Carotene Content

Reagents

Acetone, anhydrous sodium sulphate and petroleum ether.

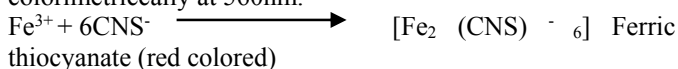
Calculation

$$\beta\text{-Carotene } (\mu\text{g}/100\text{gm}) = \frac{\text{O.D.} \times 13.9 \times 10^4 \times 100}{\text{Weight of sample} \times 560 \times 1000}$$

Determination of Iron

Principle

Ferrous iron in acid solution reacts with potassium thiocyanate to form an intense red compound, ferric thiocyanate. The compound is extracted with an organic solvent, potassium persulphate and measured colorimetrically at 560nm.



Reagents

- Stock iron solution (0.1 mg of ferric iron/ 100ml) - 0.702 mg of ferrous ammonium sulphate is dissolved in distilled water and 5ml of conc. sulphuric acid is added. It is warmed and conc. KMnO₄ solution is added drop wise until one drop produces a permanent pink color. Transferred it in 1litre volumetric flask, diluted to the mark and mixed. This solution contains 0.1mg of ferric iron per ml.
- Working or standard iron (0.1mg of iron/ml) – 5ml of stock iron solution is pipette out into a 50ml volumetric flask and distilled water is added until the volume reaches the 50ml mark.
- Standard potassium persulphate – 7.8g of potassium persulphate is shaken with 100ml of distilled water in a glass bottle.
- Potassium thiocyanate (4.3 N) – dissolved 29.3g of KSCN in distilled water and diluted it to 100ml mark.

Observation

- Colorimeter reading for blank solution = R_B
- Colorimeter reading for standard solution = R_S
- Colorimeter reading for ash solution = R_A
- Concentration of standard solution = C_s = 0.1mg/ml
- Weight of the sample = w
- Total volume of stock iron solution prepared = V
- Volume of solution used for color development = V₁

Calculation

Concentration of iron in the ash sample

$$C_s \times \frac{(R_A - R_B) \times V \times 100}{(R_S - R_B) V_1 W}$$

Determination of Calcium

Principle

Calcium is precipitated as oxalate. It is dissolved in acid and the oxalate ion is determined through titration with standard potassium permanganate.

Observation

Weight of sample = 5ml
 Volume of ash solution used= (V₁) = 50ml
 Volume of 0.1N KMnO₄ used for sample = A
 Volume of 0.1N KMnO₄ used for control = B

Calculations

1ml of 0.1N KMnO₄ = 2mg calcium
 Amount of calcium in 100gm of sample =

$$2 \times (A-B) \times \frac{V_1 \times 100}{V \times W}$$

Results and Discussion

The data of the present study “Blending quality of mint and orange based Nutritious herbal beverage” on different aspect as per methodology was tabulated analyzed statistically. The result obtained from the analysis is presented and discussed in this chapter.

Average percentages of nutrients in control and treated samples of “Orange and celery beverage with mint

Treatments \ Nutrients	T ₀	T ₁	T ₂	T ₃	T ₄
Energy (kcal)	88.6	11.58	12.36	13.14	13.92
Total carbohydrate (gm)	21.7	2.28	2.34	2.4	2.46
Vitamin-C (mg)	64	51.66	50.92	50.18	49.44
Carotene (µg)	15	148.1	180.2	212.3	244.4
Iron (mg)	0.7	1.77	2.7	2.4	2.11
Calcium (mg)	5	13.9	17.8	21.7	25.6

The above table shows the nutritional composition of the beverage containing only orange juice (100ml) and sugar (20gm) as the control T₀. It has an appreciable amount of energy and carbohydrate. The vitamin-C content is good, but carotene, iron and calcium amounts are not up to the mark. In the treated samples, where celery juice and mint extract has been incorporated along with Stevia powder as the natural sweetener instead of using sugar, the carbohydrate and energy amounts have been reduced considerably. 20ml celery juice has been added to all the treated samples and mint extract as T₁ (2ml), T₂ (4ml), T₃ (6ml) and T₄ (8ml).

The vitamin-C content has almost remained constant but the amount of carotene, calcium and iron have spiked to a great extent. The iron, calcium and carotene content of T₄ is the highest, that is, 2.7mg, 25.6mg and 244.4µg respectively followed by T₃, T₂ and T₁. This has been noted to be the lowest for T₀ being 0.7mg, 5mg and 15µm respectively. The amount of Stevia was kept constant for each treatment (17.5mg). Only the control T₀ has 20gm of sugar which causes its calories content and carbohydrate to go high, that is, 88.6 kcal and 21.7 gm respectively. This amount has been considerably lowered in the treated samples of the product, that is, 11.58 kcal and 2.28gm for T₁, 12.36 kcal and 2.34 gm for T₂, 13.14 kcal and 2.4 gm for T₃ and 13.92 kcal and 2.46 gm for T₄. Thus T₁ has the lowest amount of carbohydrate and energy among all the treated samples of the product.

Conclusion

From the result summarized it is concluded that celery juice with fruit pulp can be successfully incorporated regularly in everyday fruit beverages according to their recipes. The

prepared drinks were accepted with regard to sensory characteristics. Nutritional composition of prepared health drinks regarding carbohydrates and energy was found to be satisfactory. On the other hand, the qualities of the drinks were improved rapidly on addition of celery and mint and by replacing sugar with Stevia. The amount of iron, carotene, calcium and vitamin-C was greatly improved in the treated samples of the products.

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