PREPARATION AND PROCESSING OF BEETROOT FOR THE PRODUCTION OF NUTRITIOUS ENERGY HEALTH DRINK POWDER WITH NATURAL FLAVOURS


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ABSTRACT

Objective: In modern virulent disease situation, Consumer awareness is more important for the harmful impact of malnutrition and anemia on health. The current study attempts to establish a new concept for the production of Beetroot malt. In view of their health recognition these Beetroot malt Energy Health Drink can be used as healthier alternative to predictable soft drinks and beverages.

Methods: The study involves the determination of physical characteristics of Beetroot energy health drink and nutrient analysis. All arranged samples are evaluated by sensory panel. Results revealed that among all the formulations (Brown sugar (Nattu Sarkarai) and white sugar) tried, Beetroot energy health drink powder brown sugar got higher sensory scores. The physico-chemical characteristics of the most adequate malt powder were analyzed.

Results: When compared with brown sugar mixed Beetroot energy health drink powder ,the sample contains significantly higher amounts of protein, fiber and minerals and vitamins (i.e., Calcium, magnesium, Iron and Phosphorous) the most suitable malt powder is then packed in HDPE and subjected for storage study for a period of 3 months at dry place. Sensory scores shows falling trend in overall satisfactoriness of the products with increase in storage.

Introduction

Red beetroot (Beta vulgaris), as a naturally occurring root vegetable and a rich source of

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photochemical and biologically active compounds, is known for its valuable roles in the development of several clinical and pathologic outcome. Unceasing and sensitive beetroot malt supplementation, as a cost-effective strategy, is proposed to hold promises in cure anemia and haemostasis, blood pressure and vascular function, renal health, and the possible effect on microbiome abundance. The main outcome and physiological response of microbiome wealth modulation included the nonsignificant variation of systolic and diastolic blood pressures. Also, some studies have suggested a reno-protective property of beetroot malt that is associated with the reduction of transience rate and favourable changes in kidney’s functional parameter among patients with renal disorders. Similarly, it is shown that the regular consumption of beetroot malt effectively increased the blood level in the body. The major blood pressure lowering effect has been seen among hypertensive subjects, which tend to be more significant among hypertensive persons and progressive among overweight adults. Within this context, this review aims to provide a complete overview on the therapeutic applications of beetroot malt in metabolic disorders and theirs underlying mechanisms. Despite the unpredictability in the set of results from the review studies, there is no doubt that promote contributing factors must be investigate more deeply in upcoming study.

In recent years, beetroot are accepted as important substitutes for major vegetable to cope up with world food shortage and to meet the demands of increasing population of both developed and developing countries. Beta Vulgaris are the group of highly variable root vegetable widely grown around the world as beetroot or beet plant for fodder and human food [2,3]. Beetroot are important vegetable in semiarid tropics of Asia and Africa (especially in India, Mali, Nigeria and Niger) with 97% of malt production in developing countries the root are favored due to its productivity and growing season under dry, high-temperature condition. The beetroot powder contains high amounts of polyphenols an antioxidant compound, they also have high on fibre and low on fat. Beetroot malt are good for anemia [4-6]. Beetroot are high in iron content high in fibre and high antioxidant activity. It helps to cure anemia and problems related to blood. Malting of beetroot causes a significant reduction in the anti-nutritional components thus improving the availability of nutrients of malt. Malting has also been reported to help increase the in vitro digestibility, improves the sensory quality and extends the shelf life of the product.
In contrast to other fruits, the main sugar in beetroot is sucrose with only small amounts of glucose and fructose (Bavec et al., 2010). Because fructose reduces human exercise capacity, a low fructose and a high sucrose content is preferable, for example, in sports drinks (Murray et al., 1989).

MATERIALS AND METHODS

Beetroot are procured from Local market at villupuram. Brown sugar, white sugar, cashew nut, almond, cardamom and other ingredients required for the development of malt powder were procure from local market. The dried beetroot powder is stored at room temperature. The almond, cashew nut and cardamom material was ground into powder by using mixer. The malt powder was prepared in two ways First sample was prepared by using combination of 50: 50 beetroot powder and Brown sugar 50 grams and other ingredients such as 100 grams of milk powder, dried almond, cashew nut and cardamom. And for sample-2 beetroot powder and White sugar (50: 50) and other ingredients, milk powder (100 grams), Dried almond, cashew nut and cardamom are added.

PREPARATION OF BETA VULGARIS (BEETROOT) ENERGY HEALTH DRINK POWDER

Peel 2 beetroot and chop them into small pieces. Soak the almonds and cashews for a minute and set aside. Grind the beetroot pieces to the fine paste in the blender. Add water only if needed. Add the beetroot paste in the hot pan and cook until the raw smell goes. After 15 minutes most of the water are evaporated. Now add the brown sugar, to make brown sugar syrup and filter it for impurities. Let the brown sugar dissolve completely. It takes about 35 minutes from the start to end. Grind the nuts and green cardamom (remove the skin and add the seeds) together in pulse mode. Add the roasted nuts powder. The brown sugar will crystalline and change into powder form. Once the mixture turns dry, it will a huge mass once cooled down. It turns to a powder with the help of blender. The same procedure was followed by the preparation of beetroot energy health drink powder with white sugar

PREPARATION OF  BEETROOT ENERGY HEALTH DRINK POWDER WITH BROWN SUGAR
Beetroot energy health drink powder powder is taken as control. The new products along with control were evaluated, by a chosen panel of 8 judges, for their sensory characteristics by using composite scoring method. A score card was prepared separately for each type of Beetroot energy health drink powder and numerical scores were assigned for each attribute. The attributes considered during the study were flavour, taste, mouth feel, colour, appearance and overall acceptability. Judges were to evaluate based on scores assigned. The best combination (Beetroot energy drink with brown sugar) was identified. This sample was taken for further nutritional analysis and storage study.

**Nutrient and Physico-Chemical Analysis**

The sample1 and the most acceptable samples were analyzed for moisture, crude fibre and fat by using the method of AOAC,1990. The protein content was estimated using Lowry’s colorimetric method and calculated as g% of protein. Carbohydrates are also determined by
using the method of DGHS manual [13].

**Storage Studies**

Packaging of the best combination of powder was done in HDPE and laminated pouches and the samples were stored at ambient temperatures. The acceptability of the stored sample was evaluated by the same panel of judges selected earlier. A five point hedonic scale was used to rank each of the attribute of the products. Sensory evaluation was carried out periodically after 15, 30, 45 and 60 days during the 2 months storage period, by the same panel of judges.

**RESULTS AND DISCUSSION**

**Adequacy of the Product**

The sensory estimation of the newly developed food revealed that the combination of 50% white sugar incorporated malt powder obtained least standard deviation (SD) among the brown sugar incorporated mixes. This Beetroot energy drink powder with brown sugar was selected for quality assessment and storage study.

**Nutrient and Physico Chemical Analysis**

The result for the nutrient and physico-chemical analysis of beetroot energy drink powder. Most acceptable brown sugar incorporated Beetroot energy drink powder, is presented in Table 1

<table>
<thead>
<tr>
<th>Parameters</th>
<th>CHO %</th>
<th>Moisture%</th>
<th>Protein %</th>
<th>Fat %</th>
<th>Crude Fiber %</th>
<th>Ash %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
<td>65.2</td>
<td>10.35</td>
<td>8.33</td>
<td>1.5</td>
<td>3.83</td>
<td>1.7</td>
</tr>
<tr>
<td>Sample 2</td>
<td>70</td>
<td>11.3</td>
<td>6.2</td>
<td>2.7</td>
<td>8.3</td>
<td>3.6</td>
</tr>
</tbody>
</table>

**Sample 1:** Beetroot energy drink powder with brown sugar

**Sample 2:** Beetroot energy drink powder with white sugar

**Table 1.** Nutrient and physicochemical composition of Beetroot energy drink powder with brown sugar

Values are means of two observations; sample 1 Beetroot energy drink powder with brown sugar, sample 1 most acceptable brown sugar incorporated beetroot powder. The carbohydrate
content is low in white sugar incorporated beetroot energy drink powder Sample-2 when compared to sample 1. This may be attribute to the higher protein content in the most acceptable sample than that of sample 1.

Moisture content was decreased in the sample 1 than that of Sample 2 due to decrease of vegetable moisture up to 5%. A significant increase in the protein content was observed on malting of beetroot and decrease in carbohydrates and loss of low molecular weight nitrogen and rising of vegetable.

The fat content was increased in sample due to incorporation of white sugar Beetroot energy drink powder. The higher content of fat in white sugar with malt could have resulted in higher value of fat obtained in the sugar incorporated sample. There was a significant increase in crude fibre in sample than that of control it may be due to the brown sugar Beetroot energy drink powder is an excellent source of fibre. The ash content of the sample was increased compared to the control due to the addition of more ingredients like beetroot powder, milk powder, and brown sugar etc.

Storage Studies

Table 2 indicates the results for mean scores for different attributes on sensory test and Table 2 shows the analysis of variation for overall adequacy of the stored food. The results for storage study revealed that equally the control and sample were suitable up to 30 days. Individually the sample was acceptable up to 60 days with mild changes. Storage studies also revealed that both the control and sample packed in HDPE are more acceptable than that of packed in plastic coated pouches.

Table 2. Sensory score Beetroot energy drink powder on storage.

<table>
<thead>
<tr>
<th>Days</th>
<th>Flavour</th>
<th>Mouth sense</th>
<th>Colour</th>
<th>outward show</th>
<th>Overall adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Sample in HDPE pouch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Sample A</th>
<th>Sample B</th>
<th>Sample C</th>
<th>Sample D</th>
<th>Sample E</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>4.1</td>
<td>4.6</td>
<td>4.5</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>30</td>
<td>4.0</td>
<td>4.3</td>
<td>4.4</td>
<td>4.0</td>
<td>4.3</td>
</tr>
<tr>
<td>45</td>
<td>3.5</td>
<td>4.1</td>
<td>4.0</td>
<td>3.9</td>
<td>4.0</td>
</tr>
<tr>
<td>60</td>
<td>3.6</td>
<td>4.0</td>
<td>4.0</td>
<td>3.7</td>
<td>3.7</td>
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</tbody>
</table>

**B-Sample in plastic-coated pouch**

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Sample A</th>
<th>Sample B</th>
<th>Sample C</th>
<th>Sample D</th>
<th>Sample E</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>4.2</td>
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<td>4.8</td>
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<td>3.4</td>
<td>3.6</td>
<td>3.3</td>
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</tbody>
</table>

HDPE: High density polyethylene

**Conclusion**

The present study concludes that Beetroot energy drink powder prepared within corporation of brown sugar was found to be best combination with respect to sensory evaluation. With increasing health consciousness among people and increasing demand of foods which reduce the risk of diseases, there is tremendous scope and market opportunity for development of such value added products which could find commercial value. The Beetroot energy health drink powder with brown sugar can be recommended as health foods for all age groups because consumption of nutrient dense foods such as those developed will not only help the nutritional status but also provide further health benefits.

**References**


