

Designing a ready to serve herbal drink having energy, healing and refreshing effect for task oriented individuals

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Abstract

It is most appropriate to have Ready to serve drink without any further preparation like boiling / dissolving or adding sugar, salt etc., having energy, healing effect and refreshing effect for Task oriented individuals (TOI) like hikers, soldiers and archaeologists engaged in increased physical activities in extreme environments for longer working times. Designed drink fulfil energy requirement, supplying 205 kcal per serving, added menthol capable of stimulating the consumer and act as carminative (anti-flatulent) and refreshing agent. Beli (Bale fruit in English) has a great cooling effect and a marvellous ability of neutralizing the gastric environment. Therefore, it is renowned as the ideal natural agent to cure the discomforts of gastritis. In addition, contains a variety of vitamins and minerals which helps to improve the immunity and aids the energy metabolism as well. Bee honey is the best natural energy booster readily available in Sri Lanka and in the sub continent region. Contains simple sugar in higher density and the natural organoleptic compounds present gives a fascinating taste compared to sucrose (table sugar). This drink fulfil the requirements like energy, healing, refreshing and carminative effect to a level beyond satisfaction, a single drink is designed; made out of Beli fruit juice, Bee honey and menthol in combination.

Keywords: bael, bee honey, menthol, task oriented individuals, herbal drink, healing effect, refreshing effect

Introduction

Beli or Bael (*Aegle marmelos*) is a tropical tree found in many Asian countries including India, Nepal, Myanmar, Thailand, Malesia, Andaman and Nicobar islands and Sri Lanka [2]. Most of these countries consider this tree as a medicinal plant whose fruits, flowers and leaves are used for medicinal purposes [3]. Pulp without seeds and fibre of a ripen fruits are consumed by people as a delicious fruit. Bael leaves are also used for many herbal medicines and dried flowers are boiled to prepare a beverage like tea. Some instances dried shell of the fruits also use to make a drink with boiling [4]. A preliminary survey conducted found that there are seedless Beli fruits found in Thibbutumunuwa location area at the Kegalle district, although not sufficient quantities for commercially viable production. Growing this variety commercially may enable to reduce one step of processing, removal of seeds.

Medicinal value of Beal fruit is reported to be associated with tannin found 20% in rind and 9% in pulp and helps in curing

diabetes. Bael is also Some therapeutically used for many disorders including asthma, anaemia, high blood pressure, Jaundice, Diarrhoea and Typhoid and releasing troubles during pregnancy. It is also used to in healing wound and swollen joints [5, 6]. The pulp of the ripe Bael fruit contains bittersweet aromatic flesh which has a high demand in the food processing industry. Considering its therapeutic values and contents of valuable bioactive ingredients [10], making a Beal based ready to serve (RTS) drink will be very important. A beverage of this nature will be of importance for individuals engaged in difficult tasks in isolated or very remote areas. Archaeologists, hikers and soldiers are some of those who always involve in very difficult tasks with rations packs containing high preservatives and without asses for medicine or food. Those who experience any complication mentioned above can have a remedy from a designed RTS drink. Designed drink comprising qualities like drink straightaway without any preparation, easy to handle, revelling and refreshing properties.



Fig 1: Bael fruits and tree [1]

Materials and Methods

Major ingredients: Bael fruits bee honey and Minor ingredients: Menthol and Sodium Meta bi sulphite Bael fruits at correct maturity and ripening (without using un ripen or over ripen fruit) with good appearance, without any patches, marks or cracks and without insect bored fruits, Bees honey and Menthol, Bael fruits were sorted to get the best quality and menthol was found to be pure by leaflet and document provided. Compared to the availability and prices

Bees honey was analysed to check the Dextrose/ Fructose ratio for detection of adulteration since which is one of the ingredient improving medicinal values in the designed drink other than Bael fruit.

Determination of Fructose-Glucose Ratio - Sri Lanka Standards 464:1970

Reagents

Iodine solution, 0.5 N, Sodium Hydroxide solution, 0.1 N, Sulphuric acid, concentrated and Sodium Thiosulphate solution, 0.05 N.

Procedure

Total Reducing Sugars

Weighed to the nearest milligram, one gram of the prepared honey into a 250-ml volumetric flask and diluted with about 150 ml of water. Mixed thoroughly and made the volume to 250-ml with water. Pipetted out 50-ml of this honey solution into 250-ml stoppered flask. 40 ml of iodine solution and 25-ml of sodium hydroxide solution added to the flask. Stoppered the flask and kept in the dark for 20 minutes. Acidified with 5-ml of sulphuric acid and titrated quickly the excess of iodine against standard sodium thiosulphate solution. A blank conducted using distilled water instead of honey solution.

Calculations

$$\text{Glucose, percent by mass} = \frac{(B - S) \times 0.04302}{m_2} \times 100$$

Where,

B = volume, in ml, of 0.05 N sodium thiosulphate solution required for the blank;

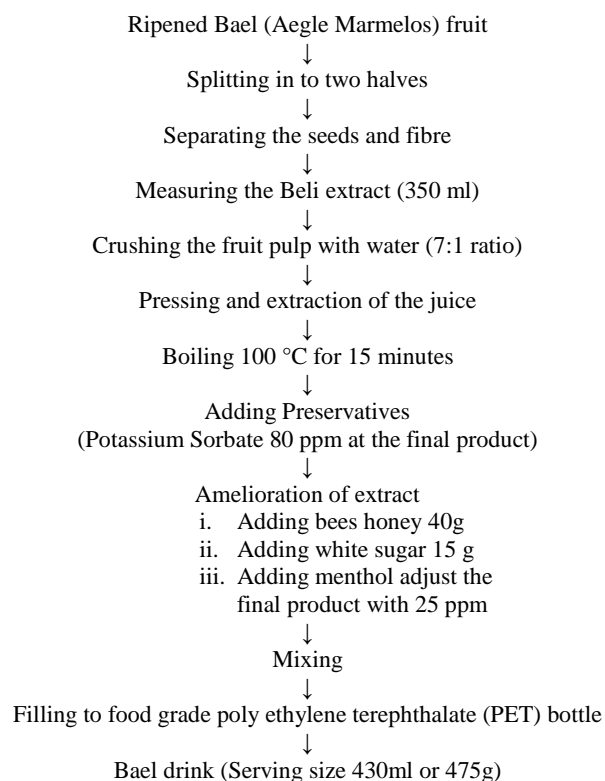
S = volume, in ml, of 0.05 N sodium thiosulphate solution required for the sample; and

m₂= Mass in 50 ml solution of the honey solution.

$$\text{Fructose percentage by mass} = \text{total reducing sugars, percentage by mass} - \text{Glucose percentage by mass.}$$

$$\text{Fructose: Glucose ratio} = \frac{\text{Fructose percentage by mass (3.2)}}{\text{Glucose percentage by mass (3.1)}}$$

Method of preparation of fruit juice



Proximate Analysis of the finished product [8]

Moisture - AOAC Official Method 1984 a, Ash - AOAC Official Method 940.26, Fat - AOAC Official Method 954.02, Protein - AOAC Official Method 920.152 and Dietary fibre - AOAC Official Method 991.43

$$\text{Carbohydrates} = 100 - [\text{Moisture} + \text{Ash} + \text{Fat} + \text{Protein} + \text{fibre}]^{[9]}$$

Results and Discussion

Determination of Fructose: Glucose ratio

Three brands were selected A, B and C from each brand 9 samples were bought randomly and subjected to the analysis. Following results were obtained.

Table 1: Glucose to fructose ratios of samples A, B and C

Sample Brand	No.	A	B	C
Fructose : Glucose ratio	1	104 : 100	100 : 100	99 : 100
	2	101 : 100	78 : 100	91 : 100
	3	109 : 100	101 : 100	99 : 100
	4	123 : 100	100 : 100	95 : 100
	5	120 : 100	96 : 100	101 : 100
	6	103 : 100	95 : 100	97 : 100
	7	140 : 100	99 : 100	100 : 100
	8	101 : 100	93 : 100	91 : 100
	9	121 : 100	100 : 100	99 : 100

Table 2: fructose variations in samples A, B and C

Sample Brand	No.	A	B	C
Fructose variation	1	104	100	99
	2	101	78	91
	3	109	101	99
	4	123	100	95
	5	120	96	101
	6	103	95	97
	7	140	99	100
	8	101	93	91
	9	121	100	99

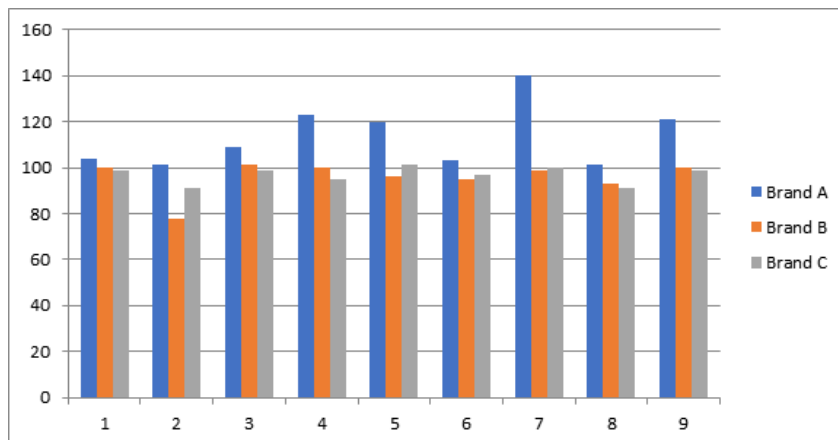


Fig 3.1: fructose variations in samples A, B and C

Graph given in figure 3.1 very clearly shows that, out of 3 samples brand A will be the most suitable one compared to Fructose to Glucose ratios and Fructose variation where fructose values are above 100. Genuine bee honey should

contain fructose 100 or above. Adulterated samples will contain fructose value less than 90. Therefore brand A was selected for the purpose of making the herbal drink [9].

Table 3: Proximate Analysis of Bael (Beli) Drink

Proximate Parameter	Amount presents Percentage (%)
Ash	0.44
Carbohydrates	13.71
Dietary Fibre	1.71
Fat	0.08
Moisture	83.31
Protein	0.75

Energy calculation

Table 4: Calorie conversion factors kilo calories per gram or the kcal/g [9]

	Labelling of Food Regulations	Mc. Cance and Widdowson	Rubner	Atwater
Carbohydrate	3.75	3.75	4.1	4.0
Glycitol	3.75	-	-	-
Protein	4.0	4.1	4.1	4.0
Alcohol	7.0	-	-	-
Fat	9.0	9.3	9.3	9.0

Most commonly used factor is Atwater there for Atwater factors used for the energy calculations [9]
 Carbohydrates - 13.71 x 4 = 54.84 kcal
 Fat - 0.08 x 9 = 0.72 kcal
 Protein - 0.75 x 4 = 3 kcal
 Total Calories per 100g = 58.56 kcal

Total calories per serving = 204.96 kcal (58.56 x 3.5)

3.3 Sensory Evaluation of the Designed Drink

32 untrained panellists were selected for the sensory evaluation with the age range between 21 and 30years

Table 5: Mode values of 32 subjected to the hedonic scale sensory test

Parameters of the drink	Taste	Oder	Colour	Appetizing capacity	Palate	Satiety	Edible portion	Inedible portion
Rank	4	2	3	4	3	2	4	-

Ranks

- 0 – Not satisfactory
- 1 – Fairly Satisfactory
- 2 – Satisfactory
- 3 – Good
- 4 – Very good

Overall rank for the drink is 3.14 which proves that the newly designed drink is being in between 3 and 4 is acceptable by the task related individuals.

4. Conclusion

Drink was made out of very good quality locally available bael fruits with very good quality ingredients like bee honey and menthol producing medicinal properties.

Drink would fulfil the requirements like thirsty, refreshing effect, satiety, healing and carminative requirements.

Task oriented individuals most preferred because no preparation involving for the drink, easy to carry and easy to handle. They can save time and stay for delay meal.

Drink would supply energy and nutrient with refreshing effect and boost morale of the Task oriented Individuals.

5. References

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