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Studies on physicochemical quality of herbal based flavoured beverage by using wheat grass powder and honey

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Abstract

At present time, people of all age groups required different types of vitamin, mineral, protein etc. which are sufficiently available in flavoured beverage. Flavoured beverage is one of the most popular beverage options all over the globe and liked by people of all age groups. Flavoured beverage resolves health problem and provides enough nutrition at a low cost to a large population. The present study was conducted for estimating, physicochemical quality of flavoured beverage blended with wheat grass powder extract and honey. Flavoured beverage was prepared from toned milk. In treatment T₀, T₁, T₂ and T₃, honey was added at the rate 0%, 9%, 10% and 11% of milk and wheat grass powder at the rate 1% of milk. The flavoured milk prepared under different treatment combinations were tested for carbohydrate, protein fat, ash acidity, moisture and total solids content for the quality of the product.

Keywords: wheat grass powder, honey, flavoured beverage

Introduction

The flavoured beverage is a beverage in which sugar, flavouring agents and colouring material are added. It contains all the constituents of milk. Flavored milk provides the same 9 essential nutrients as plain milk (unflavored) including protein, calcium, potassium, phosphorus, vitamins A, D, and B₁₂, riboflavin and niacin. Fluid milk is the number one single food contributor of calcium, potassium, phosphorus, and vitamin D (Rafferty and Heaney, 2008). It provides energy and water to digest the food which regulate body temperature and prevent dehydration. Nutrient-rich flavored milk beverage comes in a variety of flavors such as chocolate as well as innovative flavors including strawberry, vanilla, mocha and root beer. Flavour plays an important role in consumer satisfaction and influences further consumption of foods. Most available aroma compounds are produced via chemical synthesis or extraction. As the most popular beverage choice in schools, flavored beverage is a highly palatable, nourishing beverage that can help particularly children, meet current daily dairy food and calcium intake recommendations. Flavored beverage can improve daily consumption and lower the intake of soft drinks and fruit drinks, and increase calcium intake (Johnson *et al.*, 2002) [3].

Wheat grass is cost efficient and a source to provide all kinds of nutrients like vitamins, proteins, minerals, antioxidants and medicinal benefits for a healthy and rejuvenating body. Wheat grass has high concentration of chlorophyll, minerals (calcium, potassium, iron, magnesium, sodium and sulphur), and 17 forms of amino acids, vitamins (A, B, C, E and K) and active enzymes (Lee *et al.*, 2003) [4]. It is nature's finest medicine. It contains 98 of 102 earth elements found in soil as well as essential enzymes. It has twice vitamin A as in carrots and is higher in vitamin C than oranges. 15 pounds of wheat grass is equivalent to about 350 pounds of carrot, lettuce, celery and so forth (Sean, 2006) [8]. It has been proved that wheat grass helps blood flow, digestion, detoxification of the body etc (Padalia *et al.*, 2010, Ben – Arye *et al.*, 2002) [6, 1]. It also has a high content of bioflavonoids like apigenin, quercetin and luteolin. All of these enzymes contribute to its antioxidant activity. Other compounds present, which make this grass therapeutically effective, are the indole compounds, choline and laetrile (amygdalin). Wheat grass contains antioxidant enzyme super oxide dismutase which converts dangerous free radical reactive oxygen species into hydrogen peroxides, which is not destructive as superoxides molecule and an oxygen molecule (Mates *et al.*, 2000) [5].

Honey is a sweet, thick liquid made by honeybees. It contains virtually no fiber, fat or protein. Honey is a delicious, healthier alternative to sugar. Honey contains many important antioxidants. These include phenols, enzymes and compounds like flavonoids and organic

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acids. Antioxidants have been linked to reduced risk of heart attacks, strokes and some types of cancer. They may also promote eye health.

Materials and Methods

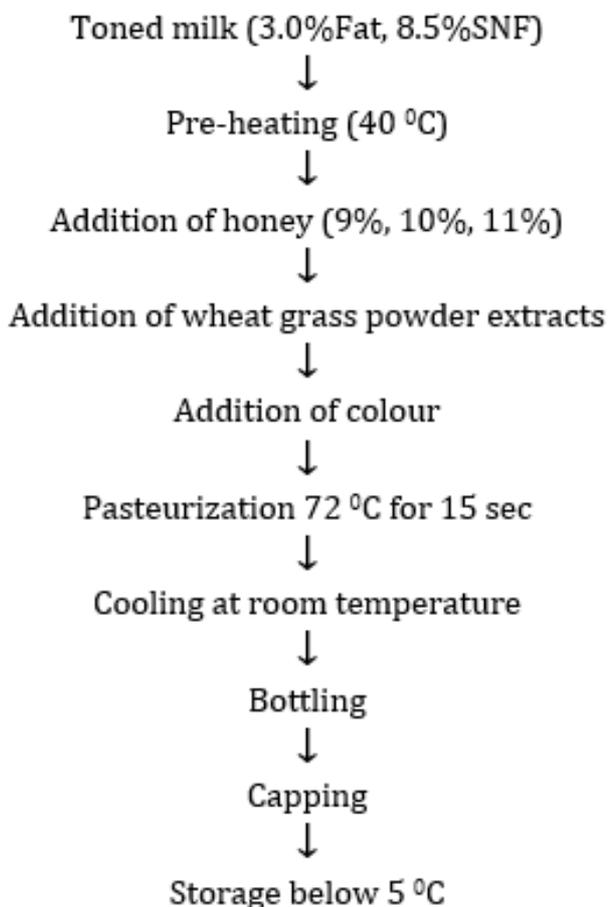
The present investigation “Studies on physicochemical quality of herbal based flavoured beverage by using wheat grass powder and honey” was carried out in the research laboratory of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology & science, Allahabad 211007, U.P India.

T ₀	Toned milk + Wheat grass powder extract (1%) + Sugar (7%).
T ₁	Toned milk + Wheat grass powder extract (1%) + Honey (9%) + colour (0.2%).
T ₂	Toned milk + Wheat grass powder extract (1%) + Honey (10%) + colour (0.2%).
T ₃	Toned milk + Wheat grass powder extract (1%) + Honey (11%) + colour (0.2%).

Preparation of wheat grass powder extract

For preparation of wheat grass powder extract, 60 ml of distilled water was taken in a beaker. 1% wheat grass powder was added and mixed well in distilled water (5 gm. in 500 ml) and then the solution was subjected to heat treatment at 80 °C for 20 minute. Solution was strained through the muslin cloth

Flow diagram for manufacturing herbal based flavoured beverage



Chemical analysis of Beverage

Carbohydrate content of the developed product was estimated according to SP: 18, Part XI (1981). Protein percentage of the developed product was estimated by Kjeldhal method as given in IS: SP: 18 (Part XI)-1981. The fat content of the developed product was determined by the Gerber method as

Procurement and collection of ingredients

- Toned milk- was purchased from Aggies Student Training Dairy, SHUATS, Allahabad
- Wheat Grass Powder – Wheat grass powder was procured from Patanjali Store at local market of Allahabad.
- Honey – Honey was procured from Patanjali Store at local market of Allahabad.
- Colour – Apple green colour was purchased from local market of Allahabad.

Treatment Combination

described in IS: SP: 18, Part XI (1981). The total ash content of the developed product was determined by muffle furnace as described in Ranganna (1986). Total Solid (TS) content of the developed product was determined by the gravimetric method as described in IS: SP: 18, Part XI (1981) in which 5ml of sample was dried to a constant weight in hot air oven at 98-100°C. Beverage samples were examined for moisture content according to AOAC (1990). Acidity was determined by using FSSAI Laboratory Manual and Ranganna (1986).

Statistical analysis

The data obtained were statistically analyzed for ANOVA using MS Excel software, 2007.

Results and Discussion

The carbohydrate, Protein, fat, ash, moisture, total solid and acidity per cent of different types of beverage samples were compiled in Table 1.

Table 1: Chemical analysis of Beverage (Mean)*

Parameter	Types of Beverage				C.D. Value
	T ₀	T ₁	T ₂	T ₃	
Carbohydrate (%)	11.09	12.31	13.49	14.75	0.01
Protein (%)	3.12	3.13	3.14	3.14	0.01
Fat (%)	2.71	2.72	2.73	2.72	0.02
Ash (%)	0.77	0.83	0.90	0.93	0.01
Total Solid	17.69	18.99	20.26	21.54	0.42
Moisture	82.31	81.01	79.74	78.46	0.42
Acidity (%)	0.15	0.16	0.16	0.18	0.02

*Average of five trials.

Developed beverage samples differed significantly ($P < 0.05$) for carbohydrate content. Carbohydrate content of beverage ranged from 11.09 to 14.75 per cent. The carbohydrate percentage showed an increasing trend as the content of honey increased (Table 2, Fig.1).

Developed beverage samples differed significantly ($P < 0.05$) for protein content. Protein content of beverage ranged from 3.12 to 3.14 per cent. The protein percentage showed an increasing trend as the content of honey increased (Table 3, Fig 2).

There was non-significant difference ($P > 0.05$) in fat content. Fat content of beverage ranges from 2.71 to 2.73 per cent (Table 4, Fig 2).

Developed beverage samples differed significantly ($P < 0.05$) for ash content. Ash content of beverage ranged from 0.77 to 0.93 per cent. The ash percentage showed an increasing trend as the content of honey increased.

Developed beverage samples differed significantly ($P < 0.05$) for total solids content. Total solid content of beverage ranged from 17.69 to 21.54 per cent. The total solid percentage showed an increasing trend as the content of honey increased. Developed beverage samples differed significantly ($P < 0.05$) for moisture content. Moisture content of beverage ranged from 78.46 to 82.31 per cent. The moisture percentage showed a decreasing trend as the content of honey increased. Developed beverage samples differed significantly ($P < 0.05$) for acidity content. Acidity content of beverage ranged from 0.15 to 0.18 per cent. The acidity percentage showed an increasing trend as the content of honey increased.

Table 2: Detail table of average percentage of carbohydrate in developed flavoured beverage from wheat grass powder and honey

Replications	Treatments			
	T0	T1	T2	T3
1	11.08	12.31	13.49	14.74
2	11.09	12.32	13.51	14.75
3	11.08	12.32	13.50	14.76
4	11.11	12.31	13.49	14.75
5	11.09	12.31	13.48	14.74
Mean	11.09	12.31	13.49	14.75
Range	Minimum	11.08	12.31	13.48
	Maximum	11.11	12.32	13.51
F- test				S

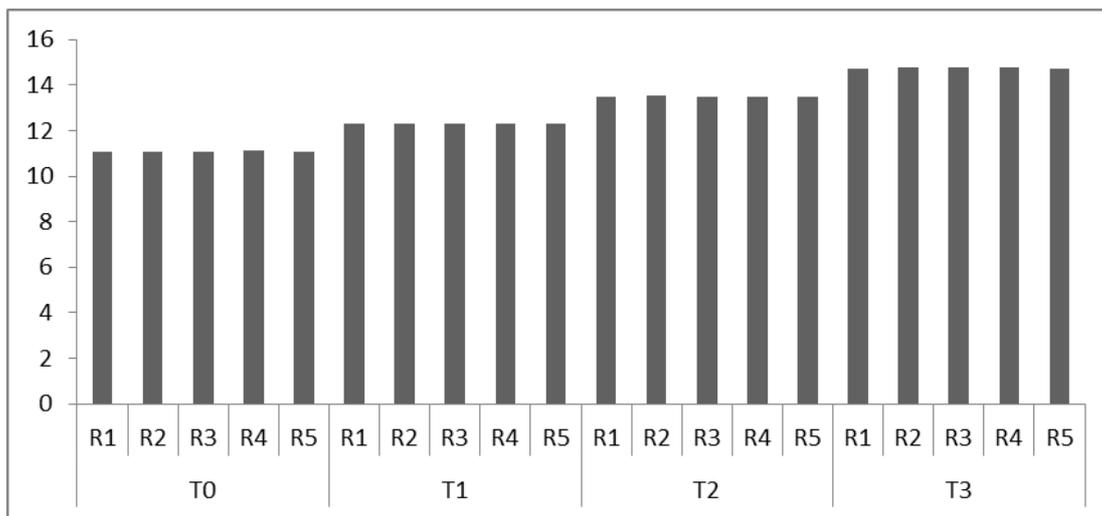


Fig 1: Average percentage of carbohydrate content in developed flavoured beverage

Table 3: Detail table of average percentage of protein in developed flavoured beverage from wheat grass powder

Replications	Treatments			
	T0	T1	T2	T3
1	3.11	3.12	3.13	3.15
2	3.11	3.12	3.13	3.14
3	3.12	3.13	3.14	3.12
4	3.12	3.13	3.13	3.15
5	3.13	3.15	3.15	3.15
Mean	3.12	3.13	3.14	3.14
Range	Minimum	3.11	3.12	3.12
	Maximum	3.13	3.15	3.15
F- test				S

Table 4: Detail table of average percentage of fat in developed flavoured beverage from a wheat grass powder and honey.

Replications	Treatments			
	T0	T1	T2	T3
1	2.71	2.72	2.73	2.72
2	2.73	2.72	2.71	2.71
3	2.69	2.71	2.73	2.73
4	2.72	2.73	2.74	2.72
5	2.71	2.72	2.72	2.71
Mean	2.71	2.72	2.73	2.72
Range	Minimum	2.69	2.71	2.71
	Maximum	2.73	2.73	2.74
F- test				NS

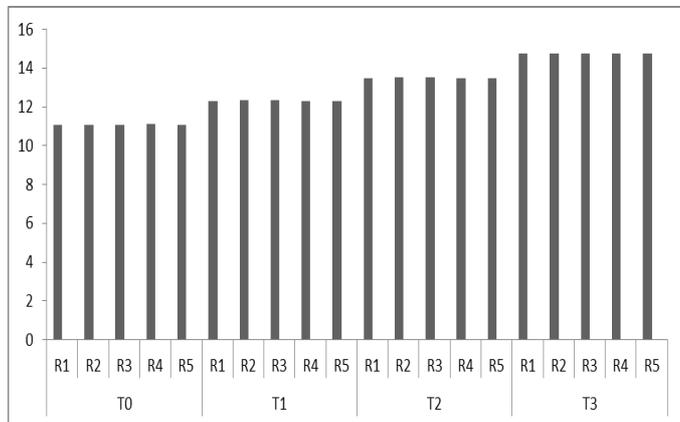


Fig 2: Average percentage of protein content in developed flavoured beverage

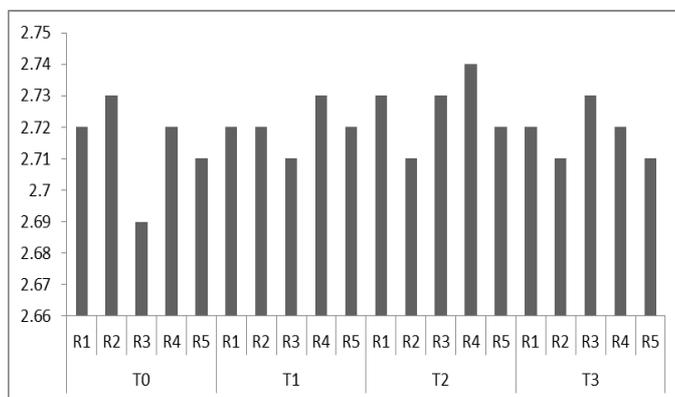


Fig 3: Average percentage of fat content in developed flavoured beverage

Conclusion

From results of the present study, it can be concluded that the wheat grass powder and honey can be successfully utilised for preparation of flavoured beverage. Addition of wheat grass powder and honey in flavoured beverage improved physicochemical quality and acceptability of the product. Treatment T₂ was found to be the best in terms of protein and fat percentage, whereas T₃ was found to be the best in terms of carbohydrate and ash percentage. Therefore, the most acceptable quality flavoured beverage can be prepared by using wheat grass powder and honey. Such replacement did not affect appreciably the composition of flavoured beverage. Wheat grass powder and honey had a positive effect on sensory attributes of flavoured beverage on its acceptability and consumption. Besides attractive flavour, it also adds nutritional importance to the product.

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