

## Formulation and nutritional evaluation health drink mixes from coconut

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### Abstract

Two types of health mixes from coconut were standardised from coconut milk powder; viz., therapeutic health drink and malted health drink. The chemical constituents of the health drinks and changes during storage in different packaging materials like polythene bags, laminated pouches were analysed at 30 days interval up to five months. For therapeutic health drink the initial content of the chemical constituents like moisture, protein, energy, fat, fiber, calcium, phosphorus, iron, free fatty acid and peroxide value were 7.68 %, 9.12 g, 335 Kcal, 1.87 g, 1.39 %, 430 mg, 222 mg, 1.76 mg, 0.23 %, 0.39 meq respectively per 100g of products and for malted health drink were 9.09 %, 15.66 g, 323 Kcal, 2.9 g, 1.62 %, 566 mg, 219 mg, 1.95 mg, 0.32 %, 0.54 meq respectively per 100g of products. Increasing trend was noted in moisture, fatty acid and peroxide during storage period. The total microbial load was BDL initially. After storage increase in *penicillium* and *mucor* was seen in polythene bags whereas laminated pouches showed no change. The cost of 100 g of health mixes was around Rs. 25/-.

**Key words:** Coconut health drink, evaluation

### Introduction

Consumers view diet as a component not only for achieving good health but also for its maintenance and possible improvement. The attention at present has been focused towards manufacturing food formulations in a variety of forms, to cater to diverse situations. (Naram, 2000). In recognition of the world wide need for more dietary proteins particularly for low income people, there has been extensive efforts to develop low cost protein food by blending certain cereal, pulses and oilseeds in such proportion as to minimize the deficiency of amino acids and to have nutritive value superior to that of the ingredients from which it has been made. Many health drinks are available in the market in the form of energy drinks, medicinal drinks, protein drinks that are in the powder form or as beverages. According to Rajagopal (1998), coconut milk is a good source of quality protein for the preparation of many useful allied food products or as supplementary protein source in places where animal protein is deficient. Sanchez and Rasco (1984) reported that the coconut milk contains proteins, other growth factors and biologically active substances. The coconut milk powder easily dissolves in water to form a

milky-white liquid with the flavour and texture of coconut milk. Under the present investigation, two health drink mixes in powder form, viz., malted health drink and therapeutic health drink using coconut milk powder was standardised.

### Methodology

#### Standardisation procedure

In the formulation of each category of health mixes in the present study, different proportions of ingredients were taken as in the standard recipe and different combinations were formulated. Each type of health mixes was prepared and presented simultaneously before the technical experts, to identify the best combination under each category using a scorecard developed for the purpose. The above exercise was repeated thrice with an interval of one week to get uniform results. Among the various proportions tried under each category of health mixes, the best combination was identified based on the overall acceptability score.

#### Composition of health drink mix

In the formulation of therapeutic health drink mix,

ingredients used were Coconut milk powder (35 %), Skim milk powder (cow's) (15%), Coconut palm jaggery (20 %), Coriander powder (10%), Pepper (5 %), Dried ginger (5 %), Cardamom (2.5%), Cumin seeds (5%), Tulsi powder (1%) and Fenugreek (1.5%).

Malted health drink was standardized using the ingredients viz. Coconut milk powder (40%), Skim milk powder (cow's) (15%), Malted wheat flour (20%), Malted barley powder (8 %), Defatted soya flour (5%), Glucose (4%), Arrowroot powder (4 %), Cocoa powder (4%) and Sorbitol (as preservative) (0.5%). All the condiments mentioned above were procured from the local markets, cleaned, roasted, powdered and sieved separately.

### Method of preparation for the Health drink mixes

In therapeutic drink mix, all the condiments were roasted, powdered and sieved (60 mesh) separately. Coconut skim milk powder and powdered coconut jaggery were added to the above powder and stored in polythene and laminated covers.

In malted health drink mix, wheat and barley were malted and powdered. Roasted soyafLOUR, arrowroot powder, glucose and cocoa powder were added to the coconut milk powder and skim milk powder, mixed well and stored in laminated and polythene pouches.

The health drink mixes standardized were analysed for chemical and nutritive characteristics, organoleptic features, stability and suitability of storage media, microbial profile and cost-benefit analysis of the products.

## Results and Discussion

### Chemical and Nutritional Characteristics of Health Drinks Powder

Two types of health drink mixes standardised in the present investigation recorded moisture content of 7.68 % and 9.09% in therapeutic and malted health drink respectively (Table 1). Calorie content of health drink II was 323 as against 335 in therapeutic mix I. Protein content of the mixes was 9.12 g and 15.66 in 100 g mix I and mix II respectively. Mineral content in the mixes viz., calcium, phosphorus and iron were 430mg, 223mg and 1.76 mg respectively in mix I and 566 mg, 219 mg and 1.95 mg in mix II. Free fatty acids and peroxide were 0.23% and 0.32 % and 0.39meq to 0.54 meq respectively in mix I and II. Chemical and nutritional constituents present in the two mixes developed differ significantly except for energy. The health drink II had higher level of protein, fat, fiber and calcium. The energy content was on par in the two products.

Table 1. Chemical and nutritional characteristics of health drinks powder

Characteristics	Products		F <sub>40,4</sub>	CD
	I	II		
Moisture (%)	7.68	9.09	1552.75**	0.07
Protein (g/100g)	9.12	15.66	2568**	0.71
Energy (Kcal)	335	323		NS
Fat (g/100g)	1.87	2.90	1089**	0.06
Fibre (%)	1.39	1.62	317.43**	0.03
Calcium (mg/100g)	430.33	566.37	5181**	3.82
Phosphorus (mg/100g)	222.77	219.32	47.39**	1.01
Iron (mg/100g)	1.76	1.95	203.69**	0.03
Free Fatty acid (%)	0.23	0.32	84.30**	0.02
Peroxide (meq/100g)	0.39	0.54	1022**	0.03

I- Therapeutic health drink mix II- Malted health drink mix

\*\* Significant at 1%

The appearance and colour of the malted health drink were highly appreciated by the technical experts as compared to therapeutic health drink while flavour and taste parameters were in favour of therapeutic drink. Overall acceptability of the two products was above 70 % indicating well acceptance of the products among judge panels (Table 2).

Table 2. Organoleptic features of health drinks

Products	Mean score for sensory attributes					OA
	Appearance	Colour	Flavour	Taste	Consistency	
T <sub>1</sub>	3.5	3.3	3.9	4.0	2.8	3.5
T <sub>2</sub>	3.8	3.6	3.5	3.2	3.0	3.42
F <sub>180,4</sub>			41.16	10.51		
CD	NS	NS	0.21**	0.19**	NS	NS

\*\* Significant at 5% level.

T<sub>1</sub> - therapeutic health drink, T<sub>2</sub> - malted health drink OA = overall acceptability

### Changes in the chemical and nutritional characteristics of health drink powder with storage

Chemical characteristics viz. protein, energy, fat, fiber, calcium, phosphorus and iron were found to be unchanged with storage in both the products. However, changes were recorded with respect to moisture, free fatty acid and peroxide contents. Moisture content increased from 7.72% to 7.89 % when stored for six months in therapeutic health drink and 8.13% to 10.57 % in malted health drinks respectively.

In the products stored in different storage containers moisture content varied. When stored in polyethylene pouches change in moisture content was conspicuous after ninety days, whereas in laminated pouches, change in moisture level was less and steady till 4 ½ months of storage.

Table 3. Changes in chemical and nutritional characteristics of health drink powder and its interaction with products, containers and storage periods

Characteristics	Products	Containers	Duration(months)				
			Initial	11/2	3	41/2	6
Moisture%	T <sub>1</sub>	C <sub>1</sub>	7.72	7.53	7.54	7.59	7.62
	T <sub>1</sub>	C <sub>2</sub>	7.72	7.60	7.70	7.84	7.89
	T <sub>2</sub>	C <sub>1</sub>	8.13	8.51	8.55	9.13	10.07
	T <sub>2</sub>	C <sub>2</sub>	8.13	8.67	9.23	9.79	10.57
F <sub>30,4</sub> -T 1552.75**, P 122.82**, C 21.36**, TP 101.93**, CD-T 0.07, P 0.11, C 0.07, TP 0.16.							
Free Fatty acid%	T <sub>1</sub>	C <sub>1</sub>	0.00	0.00	0.17	0.27	0.52
	T <sub>1</sub>	C <sub>2</sub>	0.00	0.00	0.28	0.47	0.47
	T <sub>2</sub>	C <sub>1</sub>	0.00	0.00	0.28	0.34	0.51
	T <sub>2</sub>	C <sub>2</sub>	0.00	0.00	0.47	0.50	0.50
F <sub>30,4</sub> -T 84.30**, P 40.98**, C -ns, TP 104**, TC 3.46*, CD-T 0.294, P 0.380, TP 0.658 TC 0.416							
Peroxide (meq/100g)	T <sub>1</sub>	C <sub>1</sub>	0.00	0.10	0.50	0.62	0.71
	T <sub>1</sub>	C <sub>2</sub>	0.00	0.00	0.28	0.51	0.73
	T <sub>2</sub>	C <sub>1</sub>	0.00	0.20	0.71	0.82	1.06
	T <sub>2</sub>	C <sub>2</sub>	0.00	0.00	0.52	0.83	0.91
F <sub>30,4</sub> -T 1022**, P 40.98**, C -ns, TP 104**, TC 3.46*, CD-T 0.294, P 0.380, TP 0.658 TC 0.416							

T<sub>1</sub>-therapeutic health drink, T<sub>2</sub>- malted health drink C<sub>1</sub>- Poly propylene cover C<sub>2</sub>- laminated pouches

\*Significant at 5 % level \*\*Significant at 1% level

Free fatty acid content of the health drink mix ranged from 0.17 to 0.47 % and 0.28 to 0.51% respectively in laminated pouches and polyethylene pouches. Storage containers also influenced the free fatty acid content of the health drink mix. Changes was significant after three months in the products stored in both polyethylene pouches and laminated pouches.

Similarly, peroxide content of health drink mix also found to change significantly with storage periods. Significant increase was observed after one month of storage. A significant difference was also recorded with storage containers. Significant increase was observed after one month of storage in polypropylene covers.

### Changes in the organoleptic features of health drinks with storage

The health drink mixes were stored for a period of six months in polythene and laminated pouches and tested periodically for changes in organoleptic features.

A significant difference in the 'appearance' attribute was recorded between the two health drinks, and with the storage periods. (Table 4). The appearance score decreased and change was observed after 90 days. Containers also affected the appearance of the products.

The product appeared better in laminated pouches than in polypropylene covers.

Consistency was found to vary with the products and the storage period influenced the doneness attribute. The score decreased and changes appeared after 90 days. However, containers do not affect the doneness of the products.

Similar trend was observed with respect to colour, flavour and taste attributes of two products. Average scores decreased significantly, in both the products and the decrease was less in the products stored in laminated pouches. When overall acceptability of the products was considered, therapeutic health drinks scored better for attribute flavour and taste and health drinks scored high for appearance and colour. The drastic changes in sensory attributes were noted only after a period of six months and hence the shelf stability could be recommended as 6 months, in laminated pouches.

Table 4.Changes in the organoleptic features of health drinks with storage

Attributes	Products	Containers	Duration (months)					CD
			0	11/2	3	41/2	6	
Appearance	T <sub>1</sub>	C <sub>1</sub>	4.0	4.0	3.9	3.9	3.8	
	T <sub>1</sub>	C <sub>2</sub>	4.0	3.9	3.5	3.5	3.0	
	T <sub>2</sub>	C <sub>1</sub>	3.5	4.0	3.5	3.4	3.1	
	T <sub>2</sub>	C <sub>2</sub>	3.1	3.1	2.3	2.2	2.2	
F <sub>180,4</sub> -T 44.72, P 4.89, C 35.57 TP 5.52 CD-T 0.22, P 0.34, C 0.22 TC 0.31 PC -ns,								
Colour	T <sub>1</sub>	C <sub>1</sub>	4.1	4.1	4.1	3.9	4.1	
	T <sub>1</sub>	C <sub>2</sub>	4.1	4.1	3.7	3.7	3.2	
	T <sub>2</sub>	C <sub>1</sub>	3.3	4.1	3.4	3.2	4.1	
	T <sub>2</sub>	C <sub>2</sub>	3.6	3.6	2.4	2.4	2.2	
F <sub>180,4</sub> -T 41.12, P 5.99, C -28.93 TC 5.12 PC 5.90 CD-T 0.21, P 0.33, C 0.21 TC 0.29 PC 0.46,								
Flavour	T <sub>1</sub>	C <sub>1</sub>	3.9	3.7	3.9	3.9	3.9	
	T <sub>1</sub>	C <sub>2</sub>	3.9	3.8	3.5	3.5	3.0	
	T <sub>2</sub>	C <sub>1</sub>	3.5	3.9	3.0	3.1	3.0	
	T <sub>2</sub>	C <sub>2</sub>	3.2	3.0	2.6	2.5	2.3	
F <sub>180,4</sub> -T -41.16, P -4.29, C -17.51 CD-T -0.21, P -0.33, C -0.21								
Taste	T <sub>1</sub>	C <sub>1</sub>	4.0	3.9	3.7	3.7	3.6	
	T <sub>1</sub>	C <sub>2</sub>	3.6	3.9	3.4	3.2	3.2	
	T <sub>2</sub>	C <sub>1</sub>	3.2	3.7	3.5	3.4	3.2	
	T <sub>2</sub>	C <sub>2</sub>	3.4	3.3	3.5	3.7	2.3	
F <sub>180,4</sub> -T 10.51, P 4.84, C 5.78 CD-T 0.19, P 0.30, C 0.19								
Consistency	T <sub>1</sub>	C <sub>1</sub>	3.9	3.9	3.5	3.5	3.6	
	T <sub>1</sub>	C <sub>2</sub>	3.5	4.0	3.3	3.4	2.8	
	T <sub>2</sub>	C <sub>1</sub>	2.8	3.7	2.8	2.9	3.1	
	T <sub>2</sub>	C <sub>2</sub>	2.8	3.0	2.7	2.7	2.0	

F<sub>180,4</sub>-T 10.19, C 4.53, CD-T 0.63, C 4.53

T<sub>1</sub>- therapeutic health drink, T<sub>2</sub> - malted health drink C<sub>1</sub>- Poly propylene cover C<sub>2</sub>- Laminated pouches

\*Significant at 5 % level

### **Microbiological analyses of the products**

The changes in microbial counts of the products were minimal during the eight weeks of storage. The products being dry and rich in condiments were bound to last for a long period of time. *Pencillium* and *Mucor* were the predominant spoilage organisms in therapeutic health drinks and malted health drink. *Coliform* count was negative throughout the storage period.

### **Product yield ratio and cost of production**

The product yield ratios for the therapeutic and

malted health drinks were 1: 0.90 and 1: 0.85 respectively. The cost of 100 g of health mixes was around Rs. 25/-.

### **References**

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