

Standardisation of Coconut water based beverage

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ABSTRACT

Coconut water, is one of the world's most versatile natural product. This refreshing beverage is consumed world wide, as it nutritious and at the same time beneficial to health. The wastage of coconut water in Oil mills is an environmental problem and since studies on Commercial beverages based on mature coconut water are less reported, this study was undertaken to develop mature coconut water based beverage. Seven treatments were formulated to test the sensory quality. Treatment T₇ comprising of Coconut Water, sugar, cardamom and lime juice was rated high by the sensory panel. To optimize the flavor of the treatment, 8 formulations of different flavourings were evaluated. Ginger and cardamom flavor were rated the best among these. Twenty minutes of pasteurization with addition of 300 ppm of potassium meta bi sulphite enhanced the shelf stability of the drink

Key Words : Coconut water, Beverage, Oil mills, Sugar, Cardamom, Lime juice

INTRODUCTION

Coconut water is the juice of the endosperm found within the cavity of the coconut, which begins to form around 2 months after the natural opening of the inflorescence (Vigliar *et al.*, 2006). It varies in volume and nutrients depending on the maturity of the nuts. Coconut water with its many applications, is one of the world's most versatile natural product. This refreshing beverage is consumed world wide, as it nutritious and beneficial for health. There is increasing scientific evidence that supports the role of coconut water in health and medical applications. This is mainly attributed to its unique chemical composition, comprising of sugars, vitamins, minerals, aminoacids and phytohormones (Yong *et al.*, 2009).

Total reducing sugars and protein content increase as coconut matures. However total sugar, reaches a peak of 2.9 per cent on the ninth month and then declines. This is the reason why coconut water, from young nuts are substantially sweeter than mature nuts. The sugars include simple sugars such as glucose, fructose and sucrose and sugar alcohols, mainly sorbitol.

As reported by Coconut oil processing mills, the

wastage of coconut water in these mills is a grave environmental problem and since studies on beverages based on mature coconut water are less reported, this study was undertaken to develop mature coconut water based beverage



METHODOLOGY

Coconut water from mature nuts (7-9 months maturity) were obtained from Farmer's plots at Nanniyod panchayath. Refractive index of the raw material was noted (5⁰ Brix). The refractive index of the material was raised to 20⁰ Brix by adding sucrose. Ingredients like sugar and citric acid were added in different proportions as detailed below (T₁-T₇) Hundred ml of Coconut water was taken in each case-

T₁- Coconut Water+Sugar(5g)

T₂ -Coconut Water+Sugar(10g)

T₃- Coconut Water+Sugar(5g)+citric acid(0.1%)

T₄- Coconut Water+Sugar(10g)+ citric acid(0.1%)

T₅- Coconut Water+Sugar(5g)+Cardamom(0.05g)

T₆ -Coconut Water+Sugar (10g) + Cardamom (0.05g)

T₇- Coconut Water+ Sugar (10g)+ Cardamom (0.05g) + lime juice(15 ml)

In order to identify the optimum flavor seven treatments were again formulated as detailed below and evaluated for their sensory quality. Coconut water was taken at the rate of 100ml and the refractive index was balanced at 10⁰ Brix. Spices like cardamom, clove, nutmeg, ginger are also reported to have antimicrobial properties.

T₁- Coconut Water+Sugar(10g)+lime juice(15 ml)

T₂ - Coconut Water+Sugar(10g)+lime juice(15 ml) +Cardamom(0.05g)

T₃- Coconut Water+Sugar(10g)+ lime juice(15 ml) + Clove (0.25g)

T₄- Coconut Water+Sugar(10g)+lime juice(15 ml) +Cinnamon (0.025g)

T₅- Coconut Water+Sugar(10g)+lime juice(15 ml) +Nutmeg (0.025g)

T₆ - Coconut Water+Sugar(10g)+lime juice(15 ml) + Dried ginger (0.025g)

T₇- Coconut Water+Sugar(10g)+lime juice(15 ml) + Ginger extract (0.01%)

T₈ - Coconut Water+Sugar(15g)+lime juice(15 ml) + Ginger extract (0.01%)

The formulations were mixed with potassium meta bi sulphate @ 300 ppm and pasteurized for 20 minutes in a water bath at 90 deg. The two selected samples were stored at room temperature and refrigerated in dry bottles.

Microbial study:

Shelf life study of the beverage was carried out at two different temperature conditions- room temperature and refrigerated. After pasteurisation the beverage was packed in plastic bottles into two sets and one set was kept at room temperature, in a dark cabin and the other set was kept in a refrigerator (4°C). The samples were examined weekly for 6 weeks.

The microbiological analysis was carried out by plating the serially diluted beverage samples into Nutrient agar (for Standard Plate Count), Kennight's agar (for the detection of actinomycetes), Rose Bengal agar (for the detection of fungus) and EMB agar (for the detection of pathogenic enterobacteria).

RESULTS AND DISCUSSION

The mixes were tasted by a sensory panel of 10 members, who evaluated the samples on a 9 point scale; the values ranged from 1 (very poor) to 9 s (like extremely). The mean of scores were computed using Kruskal wallis test and the results are presented in Table 1.

Treatment T₇ was selected as the best among the treatments with respect to sensory parameters.

The results of flavor optimization are presented in Table 2. Both treatments T₂ and T₇ were observed to

Table 1 : Sensory evaluation of Coconut water based beverage

Treatments	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
T ₁	13.80	14.60	11.80	11.20	12.45	11.10
T ₂	27.75	27.60	25.75	25.40	28.30	26.00
T ₃	25.80	25.90	27.45	27.50	26.25	26.00
T ₄	24.00	24.60	23.55	23.30	24.20	23.80
T ₅	49.75	49.10	48.55	49.35	49.80	49.25
T ₆	46.20	45.30	50.50	50.25	46.50	49.95
T ₇	61.20	61.40	60.90	61.50	61.00	62.40
K stat	45.31	43.69	49.80	52.10	46.22	53.12
CD value (0.05%)			12.59			

Values indicated are mean rank values

Treatments	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
T ₁	14.50	13.80	12.75	13.40	14.75	14.70
T ₂	55.00	54.25	54.90	55.45	55.60	55.50
T ₃	29.05	33.60	36.90	34.90	29.00	29.00
T ₄	41.80	41.25	39.55	40.10	41.50	41.50
T ₅	34.15	33.60	31.60	32.30	34.00	34.00
T ₆	13.45	13.80	15.75	15.25	14.30	14.45
T ₇	59.50	58.20	56.75	57.10	58.90	59.10
T ₈	45.85	44.50	44.40	45.95	48.75	47.55
K stat	51.85	50.03	47.84	48.54	50.70	50.93
CD value (0.05%)	12.59					

Values indicated are mean rank values

Analysis	Room temperature storage						Refrigerated					
	WK1	WK2	WK3	WK4	WK5	WK6	WK1	WK2	WK3	WK4	WK5	WK6
SPC (Cfu/ml)	9×10 ⁶	-	-	-	-	-	-	-	-	-	-	-
Rose Bengal agar (for the detection of fungus)	-	-	-	-	-	-	-	-	-	-	-	-
Kenknight agar (for the detection of actinomycetes)	-	-	-	-	-	-	-	-	-	-	-	-
EMB (for the detection of pathogenic enterobacteria)	-	-	-	-	-	-	-	-	-	-	-	-

have high ranks.

The unpasteurized samples at room temperature indicated unacceptable appearance and flavor within three days, but kept well for over 10 days in refrigerator (4^o C).

Fruit juice is one of the ways of utilizing fruits and vegetables benefits. One of the important sections in juice



Fig. 1 : Microbial analysis in petridishes

processing is pasteurization prior to packaging (Samani *et al.*, 2016) The refrigerated pasteurised beverage showed no signs of microbial proliferation after 40 days of storage. This indicates that the pasteurization was effective and the beverage in refrigerated condition is fit for consumption even after 40 days of storage. In the case of samples stored in room temperature, there were no signs of microbial proliferation in the test agar plates. However, the consistencies of the test samples kept at room temperature become viscous after the storage of one week.

Hence, 2 formulations of high sensory appeal could be standardized, from the abundantly available coconut water. These have scope to be commercialized and sold extensively in summers and festival seasons

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