

Comparative Study of Physico-Chemical Parameters of Tender Coconut Water

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Abstract

In the present work, the comparative study of tender coconut water (TCW) was carried out from irrigated and non-irrigated areas. The parameters like sodium, potassium, calcium, phosphorous, iron, pH, acidity, magnesium, copper, chloride and sulphate of tender coconut water from irrigated and non-irrigated areas was analyzed for the comparison.

Keywords: *Tender coconut water (TCW); Sodium; Potassium; Calcium; Phosphorous; Iron; pH; Acidity; Magnesium; Copper; Chloride and Sulphate*

Introduction

Coconut water or tender coconut water has been used as a refreshing drink, cooking oil, hair oil and traditional medicine [1-5]. Tender coconut water has an antidote effect, antioxidant effect, hypolipidemic effect, cardio-protective effect, anti-atherosclerotic effect, antithrombotic effect, antifungal effect, anticancer effect, anti-cholecystitic effect, immunostimulatory effect, antibacterial activity and anti-dermatophytic activity [6-17]. The tender coconut water has been also used in coronary heart disease [17]. Tender coconut water has also been used to lower the blood pressure [18]. The green coconut water contains RNA phosphorous which was used in respiratory metabolism [19]. Coconut water is useful for the microbial growth [20] and also has antioxidant activity [21]. The coconut water contains soluble sugars, potassium, proteins, salts, oil, nicotinic acid, pantothenic acid and vitamin C [22,23]. The coconut water is also used in the organic synthesis research [24]. The chemical composition of tender coconut water varies with the hydrological and geographic change. In continuation of our ongoing research [25], in the present work we report chemical composition of tender coconut water from irrigated and non-irrigated areas.

Study area

The tender coconut water samples were collected from the Rahata tehsil which falls within North Latitude 19°45' and East Longitude 74°25'. The samples were collected during the month of January to April 2015. A total of 20 samples were collected

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from different irrigated and non-irrigated places for analysis. The study area is situated around Pravara canal, Pravara River and non-irrigated region of Rahata tehsil.

Experimental

The samples were collected, coconut fruits were removed and tender coconut water from each fruit was transferred into a new and clean polythene bottle. The determination of sodium, potassium and calcium was carried out flame photometrically [26] with working curve method. The phosphorous and iron was determined by spectrophotometrically [27]. The acidity of samples was determined by using titrimetric method [27]. The magnesium and copper were determined by atomic absorption spectrometry [26]. The chloride and sulphate were determined by turbidimetric method [26] with working curve method. The pH of the samples was analyzed by pH meter and all samples were kept in refrigerator at (2°C) for chemical composition.

Results and Discussion

The chemical composition of tender coconut water from irrigated areas was analyzed and shown in TABLE 1. The chemical composition of tender coconut water from non-irrigated areas was analyzed and reported in TABLE 2. The values of sodium, potassium, calcium, phosphorous, iron, pH, magnesium, copper, chloride and sulphate were higher for tender coconut water collected from irrigated areas than non-irrigated areas. While the tender coconut water collected from irrigated areas have less acidity as comparing to tender coconut water collected from non-irrigated areas. The coconut plants were situated near canal and Pravara River which carry municipal waste, industrial waste and domestic waste materials therefore it shows higher values for certain parameters. The higher amount of certain ions is mainly due to the selective absorption by plants. The coconut water from irrigated as well as non-irrigated region shows differences in phosphorous, sulphate and chloride content [28-30].

TABLE 1. Chemical composition of tender coconut water (irrigated areas).

Parameters	Samples									
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Sodium (mg%)	45.2	50.3	45.3	50.7	47.4	46.5	44.6	45.1	50.6	49.3
Potassium (mg%)	283.4	289.1	291.2	290.2	293.4	295.3	291.7	292.	290.6	291.9
Calcium (mg%)	45.3	50.9	48.7	48.7	46.8	47.2	46.1	47.3	50.1	49.8
Phosphorous (mg%)	9.6	9.7	9.8	8.9	9.4	9.3	8.9	9.6	9.1	9.5
Iron (mg%)	116.5	115.8	114.7	115.6	115.2	116.4	117.8	117.4	116.9	116.7
pH	4.8	4.9	4.7	4.9	5.1	4.8	5.1	4.7	4.8	4.9
Acidity (mg%)	121.3	122.4	123.5	124.1	122.8	122.6	123.8	123.4	124.7	123.6
Magnesium (mg%)	14.6	12.5	16.7	14.7	13.3	13.4	14.5	12.3	17.1	11.4
Copper (mg%)	7.4	7.6	8.7	6.1	7.3	8.8	7.2	6.9	8.4	7.5
Chloride (mg%)	103.2	104.3	105.7	111.4	101.9	107.6	115.4	117.2	118.7	102.5

Sulphate (mg %)	9.3	8.4	7.9	9.2	9.7	8.6	12.4	8.4	13.6	11.5
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TABLE 2. Chemical composition of tender coconut water (non-irrigated areas).

Parameters	Samples									
	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Sodium (mg %)	43.3	48.2	43.4	48.5	45.8	45.1	42.4	44.1	48.2	48.1
Potassium (mg %)	278.6	284.3	285.7	284.4	287.6	287.4	279.1	282.4	285.7	285.3
Calcium (mg %)	42.7	49.3	47.2	47.8	45.1	46.2	44.6	45.7	48.3	47.4
Phosphorous (mg%)	8.8	8.4	9.4	8.1	9.2	8.8	8.2	8.8	8.7	8.2
Iron (mg%)	114.7	112.3	115.1	114.8	112.7	115.2	116.1	115.3	113.7	114.3
pH	3.4	3.7	3.4	3.7	3.8	3.6	4.2	3.4	3.8	3.6
Acidity (mg%)	122.7	124.1	125.2	125.7	124.6	124.2	125.1	125.2	125.8	125.7
Magnesium (mg%)	12.4	10.2	11.3	12.6	11.8	12.1	12.7	10.1	11.5	10.2
Copper (mg%)	6.4	6.6	7.7	5.4	6.5	7.4	6.6	5.8	7.6	7.1
Chloride (mg%)	101.1	100.5	99.4	100.2	99.2	101.2	105.4	102.6	100.7	99.1
Sulphate (mg%)	8.3	7.4	6.6	7.5	7.6	7.2	6.8	7.1	9.5	8.5

Conclusion

The results show that many parameters in all samples of tender coconut water from the study area exceed the permissible limits [31] for drinking water. The values of calcium, magnesium, chloride and sulphate in all tender coconut water samples from the study area are below the permissible limits for drinking water. The pH values of all tender coconut water samples from the study area are below the permissible level of drinking water.

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