

Tender coconut water - A doctor by nature

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“Now you know.... What keeps me going?”

The concluding endorsement of Olympian P.T Usha in a TV commercial of the Board on Tender Coconut Water (TCW), where she was the Ambassador. We were proud of having Dr. P.T Usha with us in the campaign for the only reason that the energy and spirit behind this Queen of the Track is the nutritional and revitalizing effects of coconut. It was heartening to hear her that while regular earnings from coconut helped her parents to bring her up, tender coconut water helped her build up her physical strength and stamina, which remains the secret of her strength and success and what she transpires now to her next generation.

This is not the experience of P.T Usha alone. The First Citizen and the President of India Shri. Pranab Mukharji, the Prime Minister Shri.

Man Mohan Singh, former Minister for Defence Shri. George Fernandez, the late Chief Minister of Kerala Shri. K. Karunakaran, present opposition Leader Shri. V. S Achuthanandan all are supporters of tender coconut, the World's finest drink bottled by Nature.

This article is a revelation of how tender nut water impacts our health.

Health benefits of tender nut water in nutshell

□ The water of tender coconut, technically the liquid endosperm, is the most nutritious wholesome beverage that the nature has provided to humanity. It is a refreshing and agreeable drink with many medicinal values which helps the human body to energize naturally. With a calorific value of 17.4 per 100 gm, its P^H varies from 4.8 to 5.3. Presence of Ascorbic Acid at a range of 2.2 to 3.7 mg per 100 ml and vitamins B group help enriches the magical effect of this

natural drink. Mineral composition of coconut water help serve as a health drink and a nutritious beverage.

□ Sugars form the major constituents of tender coconut water. It steadily increases in the early months and falls gradually, on maturity of nuts. In the early stages, the reducing sugars viz. glucose and fructose predominate in nut water and later on it is replaced by non-reducing sugar, sucrose which constitute 50 percent of total sugar. Potassium, sodium, calcium, phosphorous, iron, copper, sulphur and magnesium are the important minerals contained in tender coconut water. Important amino acids are arginine, alanine, cystine and serine. (Tables 1-3 depict the composition values of Vitamin 'B' group, Mineral composition and Amino acid content). The amino acids and reducing sugars and minerals present in the tender coconut water and soft kernel are in the simplest form and therefore human body absorbs these directly without routing through the digestive system. This characteristic of tender coconut water and soft kernel make them functional foods.

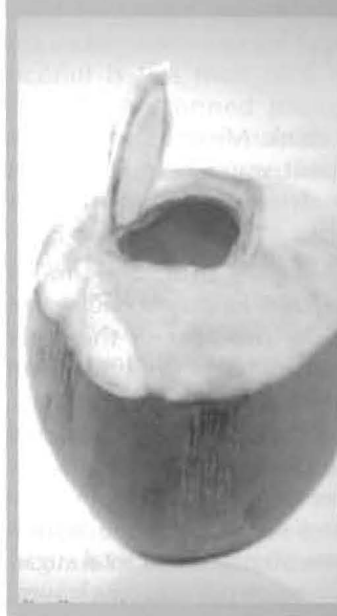
□ It is the nature's most refreshing low calorific and high nutrient drink and is a synonym for health and vitality. With proven therapeutic benefits; coconut water is widely accepted world over as a health drink. This drink ameliorates body temperature; moderates heart beats and strengthens heart muscles. In sudden drop of blood sugar tender nut water works well in the system to rejuvenate. One glass of tender nut water and one teaspoon of fresh



“I have been using tender coconut water from my early years of coaching. When all the Athletes were taking synthetic drinks; I was fond of taking tender coconut water. My habit was to take tender coconut water along with the soft kernel mixed with jaggery, as a perfect drink. But I made it a regular habit only since 1988, on the advice of Dr. M.K Abdul Azeez, a homeo doctor in Thottada, Kannur, to take tender coconut water while I was undergoing treatment for a heel injury. Undoubtedly, I can say that it is a refreshing energy drink. No other drink can be equated to tender coconut water. I strongly recommend youngsters in the sports field that they should take tender coconut water regularly, not only as a sports drink but also a health beverage. It is really a drink for all ages in all sense, as a nourishing energizer and a rehydrating agent. I know that it is the best drink we can get from nature and it will remain the best drink for ages to come”.

P.T Usha

Table -1 Constituents of Tender Coconut Water



Items	Quantity in percentage
Total solids	4.71
Reducing sugars	0.08
Sucrose	1.28
Total sugars	2.08
Ash	0.62
Unidentified organic substances	2.01
Sodium	15 mg
Potassium	312 mg
Calcium	29 mg
Magnesium	30 mg
Iron	0.01 mg
Copper	0.04 mg
Phosphorous	37 mg
Sulphur	24 mg
Chloride	183 mg

lime juice is an awesome drink for cholera patients. In traditional home medicines tender nut water is advocated in many combinations for diseases like jaundice, body pain, urinary stones, eczema, itching, stomach ache etc.

□ Tender nut water is aphrodisiac. It is an ideal drink to resolve kidney disorders. The plaques or crusts that form in the kidney are dissolved by coconut water. It is also reported that patients who suffer from difficulty in urination (stranguria) and frequent urination (polyuria) and other urinary ailments could get relief by taking tendernut water (Prof. H.P.M. Gunasena). Dr. E. Macalalang, an urologist at the Chinese General Hospital and National Kidney Institute, recommended daily consumption of tendernut water to prevent the formation of kidney stone.

□ Coconut water contains vitamins which are necessary for normal body functioning. These include Vitamin C (Ascorbic acid), Thiamine (Vitamin B1), Riboflavin

(Vitamin B2), Niacin (Vitamin B3), Pantothenic acid (Vitamin B5), Pyridoxine (Vitamin B6), Folic Acid (Vitamin B9) and Nicotinic acid (Niacin). These vitamins are water soluble and required as coenzymes essential for cellular function. Thus tender nut water is treated as a life saving tonic.

□ Tender coconut water has got beneficial effect on reducing hypertension. Hypertension is a major health problem worldwide. Increased vascular resistance and sodium retention contribute to the blood pressure elevation. Plant foods may be beneficial in decreasing blood pressure (BP). Recently much attention has been focused on plant foods that may be beneficial in preventing hypertension, metabolic syndrome and possibly reduce the risk of various diseases. In a clinical study by Gullapalli et.al to study the effect of Tender Coconut Water (TCW) on BP of Primary hypertensive subjects, it was proved that irrespective of cause of hypertension TCW has beneficial effect on BP. TCW contains high

amount of potassium which causes vasodilatation and also improve the endothelial function.

□ Potassium accounts for more than half of the minerals in coconut water. Presence of more potassium and less sodium is a congenial combination to control heart ailments. Presence of natural sugars and flavors in tender nut water contrary to the processed sugars make the difference from artificial drink. Being a cholesterol free and fat free drink it can make wonders in human system. Raja Mohan et.al studied medicinal values of tender nut water in rats. The study revealed the positive effects of tender nut water against induction of Myocardial infarction. The indicators from the study were, decreased total cholesterol, VLDL+ LDL and HDL in the serum. L-arginine, the free amino acids provides cardio protective effect through hypocholesterolemic and anti atherogenic effect.

□ Intake of tender nut water provides beneficial effect on mitochondrial activities. It rejuvenates the body instantaneously and is more

“ Those alone who have tried it, know how delicious it is, to be seated in such shade and drink the cool pleasant fluid of coconut ”
 – Charles Darwin in 1826 after drinking tender coconut water in Kaeling Islands.

important to the daily diet of athelths and sport persons. It adds vitality to ones life. It is a drink which acts on infants suffering from intestinal problems. It is the most refreshing, nutritious, cooling and therapeutic drink and is the water of life. Tender nut water has become popular for its cooling and immunity power building properties. Drinking tendernut water is the most natural

way to stay hydrated and increase energy and vigour. As a richest source of electrolytes and potassium, tender nut water enables nerves and muscles to function properly and regulates fluid levels within the cells. This drink makes energy sip truly heavenly.

□ Coconut water is unctuous, sweet, containing rich source of cardio protective factors viz. L-arginine magnesium, potassium, vitamin C and globulin. Myocardial infarction induced rats pre treated with tender coconut water (4 ml/100mg body weight) showed lower levels of cholesterol, triglycerides and phospholipids when compared with control rats. Tender coconut water also showed beneficial effects in reducing the oxidative stress developing during myocardial infarction. Tender coconut water has favorable influence on mitochondria activities and provide protection against the free radical mediated damage during myocardial infarction (Anurag et al. 2003).

□ Coconut water has anti-ageing properties. Cytokinin, the plant growth hormone which contained in tender coconut water supports cell division and promotes the rapid growth of cells. Cytokinins also reported to have cancer curing properties which may unfold new revelations in medical field. Tender nut water based lotions find application as natural beauty aids and skin care products. Regular washing of face with tender nut water is a suggested remedy to cleanse the face and bring softness and fairness.

CDB's intervention in value addition in tender coconut

a) Packaging Technique

Tender Coconut Water is bottled by nature in very hard shell as an aseptic packaging. While volume of water is at the maximum in 6 months

old nuts, water in small quantities is found in the third months of development of the nuts and reaches maximum in the eighth month and declines thereafter as the nut ripens. The drink is at its optimum level of acceptability and economic viability of commercial use when the nuts are of 6 months maturity. (Srivatsa and Sankaran, 1995) Ediriweera (1996) had reported that the water from nuts at the Kurumba stage (about 220 days old) is best suited for drinking as a beverage since glucose is highest during this stage. The huge size of the fruit hinders its fast and wider spread due to the disposal issue of outer husk and shell. This issue was addressed by Board as early in 1990 by way of developing a technology to preserve the water for longer shelf life. Board sponsored a study with Defence Food Research Laboratory (DFRL), Mysore to develop a technology to process and pack tender coconut water for marketing as a nutritious soft drink. Technology was developed for preservation and packing of tender coconut water in aluminium cans and retortable pouches. The shelf life of the product under refrigerated condition is 6 months. The Board has transferred the technology to many firms who are now in the production field. Financial support extended by the Board along with technical know how, triggered the momentum of industrialization. Many brands of

packaged tender coconut water have come up in the market and captured the domestic and international markets. Cocolal, Tendo, Anucoco & Sakthico are our leading brands.

History quotes "During Pacific war of 1941-45, emergency plasma transfusion to wounded soldiers was by siphoning tender nut water directly from the nut.

b) Soft kernel utilization

Soft kernel of tender nut is packed with vitamins and minerals. It is fat free as well. While the mature coconut kernel at the age of 12 months contains 44 % fat, soft kernel contains less than 4 % fat. This is a great advantage for utilizing this part of tender coconut which is otherwise left unutilized in tender nut water business. In the wake of the search for diabetic friendly products, sweets and puddings with less or no sugar are mostly accepted. The Bio-Science and Bio-Technology R&D wing of School of Communication and Management Studies had evinced interest in researching on the positive features of soft kernel to convert into sugar free, fat free, gluten free dairy free ice cream. The objective of the project was to utilize the low fat endosperm and the tender water for the preparation of a nutritious low fat cream, compositional analysis of the endosperm, tender water and the cream, standardization of the

Vitamins of B Group in Coconut Water

Nicotinic acid	0.64 microgram / ml
Pantothenic acid	0.52 "
Biotin	0.02 "
Riboflavin	0.01 "
Folic acid	0.003 "
Thiamine	Trace "
Pyridoxine	Trace "

Source: *The Wealth of India* (1950)



protocol at each step based on the flow chart, optimization of the process parameters etc. The proximate composition of the cream, the mineral content, amino acid profile and the low lipid content (4%), rich protein, essential amino acids and minerals has given the product a novel and nutritional status. Research is on the way to develop diabetic friendly coconut cream.

c) TNW as vehicle for herbal medicines

In Ayurvedic classics tender nut water is wholesome fruit for heart and relieves burning sensation.

Under a sponsored research study, **CARE Keralam Ltd** initiated projects to illustrate the usefulness of tender coconut water as a vehicle for herbal medicines. They have taken up two research projects aimed at establishing the usefulness of tender coconut water as a vehicle for herbal medicines that cure urinary stones and diarrhoea. Tender coconut water was transformed into a free flowing powder, which was formulated with herbal extracts having lithotritic and anti-diarrhoeal properties. This anti-diarrheal

formulation is believed to give protection from diarrhoea, which continues to be a major reason for childhood deaths in India. Similarly, tender coconut water-enriched anti-lithotritic formulation is useful in treating urinary stone.

d) Value Addition with Fruit juices

Coconut water is a good source of intravenous fluid because of its high content of glucose and fructose. It is also used as fluid for oral rehydration. Tender coconut water and juice of plantain pith has been proved effective in treating hysteria, epilepsy and nervous insomnia. It is also an antidote against roundworm induced vomiting. Cows milk and tender nut water mix nourishes infants and children. Tender nut water is used as a remedy for vomiting, fever and jaundice. These beneficial features of tender coconut **water were experimented by the Amrita School of Pharmacy, Kochi** through a sponsored research of the Board. The research involves characterization of taste, anti-oxidant potential and stability of a variety of different formulations. The study was aimed at fortification of 7 month Chowghat Orange Dwarf nut water

using natural ingredients containing antioxidant principles and stability studies of the fortified nut water. Biochemical analysis of the blended juices showed presence of antioxidant principles like Tannins, phenol, ascorbic acid. It was found that all formulations of guava, pomegranate and amla were able to provide at least 10% of RDA of Vitamin C and polyphenols showing value as nutraceutical.

Coconut water-blend with natural antioxidants is a promising step for the development of a nutraceutical. Pomegranate fruit extract possesses anti-diarrhoeal, antibacterial, anti-diarrhoeal, antifungal, antiulcer, antioxidant activity and free radical scavenging capability, strengthening of the immune system, prevention of heart disease and liver fibrosis and inhibition of lipid per oxidation even at lower concentrations than vitamin E. Amla is one of the richest sources of Vitamin C. Guava fruit contains a high level of antioxidant compounds, such as Vitamin C; carotenoids, - carotene and lycopene; and phenolic compounds, like ellagic acid and anthocyanin. The formulation of fortifying agents containing Tender Coconut Water with 10% pomegranate juice and added vitamin C and β-carotene was found to have high nutritional value, good acceptance as well as stability and antioxidant potential of four months.

Marketing of tender coconut in its natural form as **minimally processed nuts** after partial removal of husk through Food chain markets, hotels, IT campus and **Snow Ball tender coconut** (scooped out soft kernel with water inside) as food cum-beverage has acclaimed good response among tendernut lovers.

What next ? A shift in outlook?

Farmers experience is often shared that palms subject to tender

Amino Acid Composition of Coconut Water

(% of total protein)



Alanine	2.41
Arginine	10.75
Aspartic acid	3.60
Cystine	0.97 - 1.17
Glutamic acid	9.76 - 14.5
Histidine	1.95 - 2.05
Leucine	1.95 - 4.18
Lysine	1.95 - 4.57
Proline	1.21 - 4.12
Phenylalanine	1.23
Serine	0.59 - 0.91
Tyrosine	2.83 - 3.00

Source: Pradera et al, 1942

nuts harvesting yield more nuts than those harvested at maturity. Harvesting immature nuts is beneficial; because as much as 25 percent increase in nut production has been reported. The demand for tender coconuts for drinking purpose generally increases from December April-May the summer months in a year. In most of the states the maximum yield (matured nut) is obtained during April-May. If the tender nuts are harvested from December to April - May high arrival of matured nuts/milling copra in the market during February-May can be minimized, which will help balance the demand and supply. In a study conducted earlier in Kerala it was found that tender coconut production generates more income

than inter-cropping and mixed farming.

A structural change in planting population is felt essential to popularize the usage of tender coconut. Considering the high demand for this health drink globally, it would be appropriate if harvesting of more tender nuts is encouraged through farmers' collectives. The FPOs formed under the auspices of CDB should take interest in harvesting more tender nuts and popularizing more dwarf varieties. This could be facilitated by planting 25 percent dwarf variety in the new planting and replanting programme.

The State of Kerala initiated implementation of Replanting & Rejuvenation programme (R&R) in

11 districts in which replanting of dwarfs and hybrids is envisaged in place of palms cut and removed. The estimated number of palms for removal is 180 lakhs within 2-3 years, of which minimum 50 percent need replacement. Taking 25 % of this as dwarf, more than 22 lakh plant population would be tender nut yielding cultivars. Positively R&R programme will find place in the kitty of other traditional states' programme shortly. Thus in the long run country would be self sufficient in dwarf palm population. Such a cultivar mix will help augment the hybrid production programme as well, which is presently suffered due to paucity of dwarf mother palms.