

# KING COCONUT

By

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The king coconut (Thambili) which is characterized by its bright orange colour is said to have originated in Sri Lanka and is termed *cocos nucifera var. Aurantiaca*. The diagnostic characters of varieties are mostly nut size, colour of epicarp, mesocarp and thickness of endosperm.

Marco Polo, who passed through Sumatra more than seven hundred years ago described the coconut as containing an edible substance that is sweet and pleasant to the taste. He said, 'the cavity of pulp is filled with the liquid clear as water, cool and better flavoured and more delicious than wine or any other kind of drink whatever'.

The growth of the fruit follows fertilization with the rapid development of the pericarp. During the later stages of development, the cavity or the embryo sac becomes filled with liquid endosperm which increases in volume as the fruit grows. The maximum size is reached in about six months. At this stage the kernel (solid endosperm) begins to form first at the end opposite the stalk and gradually extends all round the interior. In the earlier stages, suspended in the water are large number of nuclei, which becomes incorporated ultimately into cells of the developing endosperm which at first is a noncellular jelly. The cellular developments takes place spreading the endosperm all round.

It is a common experience that when a young drinking coconut is opened, the water is expelled with some force indicating that it was under considerable pressure. It has been reported that the gas occupying the free space in the ripe nut is essentially nitrogen. It is also likely that it contains oxygen and carbon dioxide in proportions varying according to the respirating quotient at any particular stage of development with nitrogen that has seeped in.

Coconut water is the liquid endosperm that nourishes the embryo, which later develops into haustorium. The water has been found to contain substances which stimulates the growth of plants. It is a popular natural drink in areas where coconut are grown.

Studies conducted have shown no appreciable differences in chemical composition between two types of coconuts green and king coconut except for variation in total sugars and minor differences in the flavour constituents. At any corresponding stage of maturity, king coconut water has been known to contain about 1% more total sugars than that of green coconut water. A calorific value of 17.4 per 100 g of the liquid endosperm of the tender coconut (seven to eight months old) is reported.

The composition of coconut water tends to vary depending on the variety, maturity of the nut nutrient condition of the soil and other climatic conditions.

## Proximate composition

Water	95.5%
Protein	0.1%

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Fat	<0.1 %
Mineral water	0.4%
Carbohydrates	4.0%

The presence of free nuclei in the coconut water is reported.

The tender coconut water contains various minerals, of which potassium is the major constituent, and its concentration depends upon the nature of potash manuring. The mineral content of the nut water is reported as follows..

Sodium (Na <sup>+</sup> )	105.0 mg/100ml
Potassium (K <sup>+</sup> )	312.0 mg/100ml
Calcium (Ca <sup>++</sup> )	29.0 mg/100ml
Magnesium (Mg <sup>++</sup> )	30.0 mg/100ml
Iron (Fe <sup>++/+++</sup> )	0.10 mg/100ml
Copper (Cu <sup>++/+++</sup> )	0.04 mg/100ml
Phosphorus (Po <sub>4</sub> <sup>---</sup> )	37.0 mg/100ml
Sulphur (S <sup>--</sup> )	24.0 mg/100ml
Chloride Cl <sup>-</sup>	183.0 mg/100ml

When the nut ripens the composition of the water, especially the sugar content undergoes significant changes. The concentration of invert sugar (glucose and fructose) increases and reaches a maximum (4-6%). When the nut is about 220 days old, this stage is termed the 'Kurumba'. The well-established belief is that the water from nuts at the 'Kurumba' stage is best suited for drinking as a beverage. The analytical data confirms this belief, on the basis of the fact that the glucose is highest during this stage and further a maximum volume of water (ranging from 500 to 600 cc, depending on size, variety, etc) has been observed. After this period, sucrose appears and the concentration of total sugar falls.

Following amino acids and growth hormones are cited as being present in coconut water.

Glutamic acid	9.76 - 14.5%	of dry protein
Arginine	10.75	“
Leucine	1.95 - 4.18	“
Lysine	1.95 - 4.57	“
Proline	1.21 - 4.12	“
Aspartic acid	3.60	“
Alanine	2.41	“
Histidine	1.95 - 2.05	“
Phenylalanine	1.23	“
Serine	0.59 - 0.91	“
Cystine	0.97 - 1.17	“
Tyrosine	2.83 - 3.0	“

The percentage of arginine, alanine, cystine and serine in coconut water protein is reported higher than those in the cow's milk.

The water contains both vitamin C and vitamins B group. The concentration of vitamin C ranges from 2.2 to 3.7 mg per 100 ml. The following values for the vitamins of the B group have been reported.

Nicotinic acid	0.64 ug/cc
Pantothenic acid	0.52 ug/cc
Biotin	0.02 ug./cc
Riboflavin	<0.01 ug/cc
Folic acid	0.003 ug/cc
Thiamin	0.003 traces
Pyridoxin	0.003 traces

### **Nutritive and Medicinal Values**

Coconut water is a refreshing drink. The literature cites coconut water as a plasma volume expander and an electrolyte replenisher in both human and veterinary medicine. Coconut water in the unopened fruit is a sterile fluid and has been found isotonic with blood plasma and non-antigenic to dog and man. A number of reports on the use of coconut water as an intravenous and an oral fluid in both experimental and clinical cases are on record and the therapeutic efficacy of coconut water as an intravenous fluid largely depends upon its electrolytic balance.

The desired characteristic of a fluid for intravenous use is that it should resemble in its physical and chemical properties to those of the extracellular fluid (ECF). An ideal fluid for intravenous use must contain an equivalent amount of sodium, potassium, calcium etc as that of ECF.

Sodium content in the range of 1.1 to 3.4 m Eq./L is reported insignificant as compared to the sodium content of ECF. Potassium is found to be a major cation of coconut and it remained uniformly high in a study conducted irrespective of the age or source of the coconut. High potassium solution must be used intravenously with caution as the potassium ion is toxic when the plasma level exceeds 6.0 m Eq./L. The intravenous use of coconut water needs to be done with special care and diligence.

The use of tender coconut water as a remedy in gastroenteritis is receiving greater attention. It is a ready and handy boon to combat the dehydration of patients suffering from severe diarrhoea and vomiting and is a cheap substitute to, glucose, saline or plasma.

It may be a simple natural medicine given in case of dehydration. There are also other claims of its medical values such as toning up of heart muscles, increasing the heart rate, helping in the maintenance of body warmth in cases of dehydration. It increases the blood circulation in the kidneys and causes profuse diuresis. It is also a urinary antiseptic and eliminates poisons through the kidneys in cases of mineral poisoning. A Scandinavian research scholar in advocating the value of young coconut water reports that it makes one's life span longer and this drink has the quintessence of the mineral deposits that rejuvenate the wasting particles of the human body.

When the fruit is opened coconut water becomes readily inoculated with casual microorganisms and spontaneous fermentation and acidification are rapid. During the processing of young coconut water it must be ensured that the natural quality characteristics of the water is maintained. Young coconut/coconut water is certainly a boon to the coconut industry.