Robert Wetzlmayr, Austria

Coconut: Tropic Thunder

Coconut water provides a valuable nutrient pool for enhancing food and beverage, as well as cosmetic product formulations. By **Muhammed Majeed**, founder & owner, and **Lakshmi Prakash**, VP of Innovation & Business Development, Sabinsa

COCONUT water, the liquid endosperm of green coconuts (cocos nucifera), is a refreshing beverage and a natural rehydration medium. It is also used as a supplement in nutrient media for tissue culture. As it offers higher amounts of electrolytes, such as potassium and magnesium, compared to regular sports drinks, coconut water is known as a 'natural isotonic sports drink'.

Functioning as a prebiotic, coconut water solids support beneficial bacteria in the gut. The endosperm abounds in essential nutrients such as proteins, amino acids, sugars, vitamins, minerals and growth factors. This nourishes the growth of the embryo in green coconuts, and therefore potentially supports healthy cell growth and metabolism in other living tissues as well.

It is important to differentiate between coconut milk and coconut water. The first is a sweet, milky, white looking base taken from the flesh of a fully developed coconut, while the latter is the liquid endosperm of the coconut.

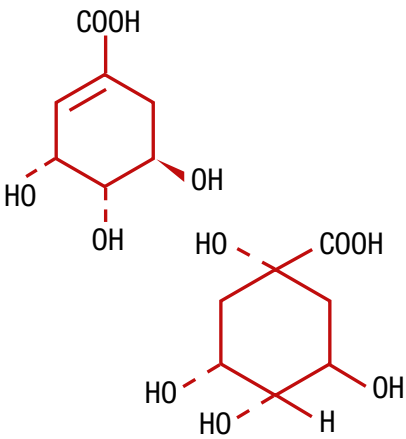
BENEATH THE HUSK

The coconut is unique in that it contains large amounts of liquid endosperm for a year or more of its life. The largest quantity of the liquid endosperm, coconut water, is however, contained in young green coconuts. It delivers vital nutrients for sustained development of the solid endosperm (coconut meat) found inside the fruit.

At the completion of growth, the solid endosperm and the last of the coconut water provide nourishment for the forming embryo and seedling. As such, coconut water serves the role as a reservoir of nutrients to support tissue growth.

NUTRIENTS GALORE

The liquid is rich in proteins, amino acids, sugars, vitamins, minerals and growth factors (refer to Table 1) with pivotal roles in supporting tissue growth. Shikimic acids and quinic acids have been found in extracts of coconut water obtained from fruits at various stages of development, with the greatest amounts being found in young, green coconuts.



Source: Boyce Thompson Institute

Table 1: Vitamins, Growth Promoters, Sugar, alcohols, and minerals in coconut water

Compound	mg/ltr
Nicotinic acid	0.64
Pantothenic acid	0.52
Biotin	0.02
Riboflavin	0.01
Folic acid	0.003
Thiamine	Trace
Pyridoxine	Trace
Auxin	0.07
Gibberellin	*
1 ,3-Diphenylurea	5.8
Sorbitol	15
M–inositol	0.01
Scyllo -inositol	0.05
	mg/100g
Potassium	312
Chloride	18 3
Sodium	105
Phosphorus	37
Magnesium	30
Sulfur	24
Iron	0.10
Copper	0.04

Table 2: Sports drinks vs coconut water.

Component	Sports Drinks (mg/100 ml)	Coconut Water (mg/100 ml)
Potassium	11.7	294
Sodium	41	25
Chloride	39	118
Magnesium	7	10
Sugars	6	5

Swaminathan, Gurgaon, India

These alicyclic acids participate in aromatic biosynthesis, and are therefore significant in the growth and development of the budding coconut. These compounds along with identified cytokinins also play an important role in the nourishment and growth of plant and animal cells.

The amount of RNA-phosphorus (RNA-P) in coconut water was discovered to be consistently high in green coconut water. The role of RNA in amino acid transport and respiratory metabolism of living cells is well known.

The RNA of coconut water would therefore efficiently support the metabolic mechanism vital to the budding endosperm tissue of the coconut, and sustain the growth of other living cells as well, in tissue culture.

GULPING ENERGY

Coconut water has been used in the tropics as a nutritive and rehydrating agent to restore electrolyte balance in cases of diarrhoea. A published research report mentions that coconut water can be used as a short-term intravenous fluid. Other reported applications include use in total parenteral nutrition and sports beverages. Coconut water is described as an isotonic sports beverage. A comparison of coconut water with regular sports beverages is presented below. (Refer to Table 2)

SABINSA:
RECIPE FOR YOUTH

Cococin can effectively be used for oral and topical applications and serves as a natural pool of nutrients and growth factors that support healthy aging.

A sample nutricosmetic (dietary supplement formulation):

Ingredient	Potential Functions	Quantity
Cococin	Hydration, Nutritive Support	75 mg
Tetrahydrocurcuminoids	Bioprotectant	75 mg
Triphala Extract	Cleansing	75 mg
Ginger Extract	Anti-Inflammatory, Digestive Aid	20 mg
Multi-Enzyme Preparation	Digestive Aid	30 mg
Black Pepper Extract	Bioavailability Enhancer	3 mg

Suggested level of use: one tablet or capsule, twice daily with meals

A sample of a tangy-sweet natural beverage premix formulation:

Ingredient	Weight %
Soluble Starch/Mannitol/Other Binder	62
Crystalline/Granular Citric Acid	14
Tomato Powder	5
Cococin	8
Banana (Musa Indica) Powder	6
CMC/Xanthan Gum	0.5
Potassium Bicarbonate	4
Potassium Citrate	0.2
Sodium/Potassium Chloride	0.01
Flavors (Black Pepper/Ginger)	0.4

A mix of 100 g would yield about 28 servings of 250 ml each

Since coconut water solids can support cell growth, it may be used in products to support the growth of human tissues such as hair follicles. Coconut water can therefore be used in revitalising preparations for the care of skin, hair and nails.

COCONUTS FOR NUTRICOSMETICS

A proprietary lyophilisation process produces a stable composition of coconut water with its inherent biological activity preserved. The process is designed to produce an amorphous solid, which is easy to work into food and personal care formulations.

Protein components and environment sensitive actives are protected by the amorphous nature of the solid, during subsequent processing. During storage, the material changes to the more stable, less hygroscopic, crystalline state.

In preparing the lyophilised composition cococin, green coconuts are harvested at the right stage of maturity to guarantee optimal content of RNA and growth factors. This includes shikimic acid, quinic acid and indole-3-acetic acid, essential vitamins, amino acids, and minerals.

The freeze-dried coconut water solids blend seamlessly with dry products, and readily dissolve in water. As such, coceocin provides a valuable nutrient pool for enhancing food and beverage, as well as cosmetic product formulations. APFI