

# New sports drink: coconut water

Simple production process gives tropical countries the key to a booming market



Players in the world's \$1,000 million market for "sports beverages" may find themselves facing an unexpected new competitor: coconut water. FAO has taken out a patent - its first ever - on a new process that would allow manufacturers to bottle coconut water that is biologically pure, very tasty and full of the salts, sugars and vitamins demanded by both sweating urban joggers and serious athletes.

The process was invented by Morton Satin, Chief of AG's Agricultural Industries and Post-harvest Management Service (AGSI), whose previous food inventions include high-fibre white bread and wheatless bread. "Fresh coconut water is already highly valued in tropical countries," he said. "A young coconut between six and nine months contains about 750 ml of water - really, it's juice that eventually

becomes the flesh.

"It's a natural isotonic beverage, with the same level of electrolytic balance as we have in our blood. It's the fluid of life, so to speak." In fact, during the Pacific War of 1941-45, both sides in the conflict regularly used coconut water - siphoned directly from the nut - to give emergency plasma transfusions to wounded soldiers.

Most coconut water is still consumed fresh in tropical coastal areas - once exposed to air, the liquid rapidly loses most of its organoleptic and nutritional characteristics, and begins to ferment. But the production of coconut beverages, particularly as a byproduct of processing operations such as coconut cream processing and coconut dessication, has long interested food manufacturers.

**Present processing has a drawback.** Most commercial production today is carried out in Indonesia, the Philippines and Thailand, using high-temperature/short-time pasteurization (the same technology used in UHT long-life milk). But thermal processing has a drawback - it eliminates not only the risk of bacteria, but some of coconut water's nutrients and almost all of its delicate flavour. This severely limits the product's marketability.

"The way we saw it, coconut water only had a future if we could invent a new cold sterilization process that retained its flavour and all its nutritional characteristics," Satin explained. "The answer was microfiltration technology: you filter the water through a medium - such as porcelain or a polyacrylic gel - that retains all microorganisms and spores and renders the permeate commercially sterile."

Drawing on his experience in the pharmaceutical industry, Satin conceived the new process "in about five minutes" and tested it on four coconut varieties with the help of an Italian consultant food technologist, Giuseppe Amorizzi. They also processed coconut water with added sucrose and L-ascorbic acid, to approximate the vitamin and energy content of major sports drinks. When the inventors noticed some discoloration in the water of one coconut variety - albeit an "attractive pink" - they added lime juice to retain its original transparency. Finally, they called in a panel of tasters, who could detect no difference between fresh coconut water and what came out the other end of the FAO filtering laboratory. (Get [technical details](#)

Sport drinks vs. coconut water		
Component	Sports drink (mg/100 ml)	Coconut water (mg/100 ml)
Potassium	11.7	294
Sodium	41	25
Chloride	39	118
Magnesium	7	10
Sugars	6	5

of the coconut water process.)

Late in 1997, FAO officially submitted the new process to patent offices in Canada, Japan and the United Kingdom. The UK patent was granted in May 2000. The Organization is now developing a licensing policy so that the process can be made freely available to a wide range of manufacturers. The main beneficiaries - apart from sportspeople - will be tropical countries that process or export coconuts, and small farmers who grow them. "Final details for licensing of FAO patents have not been firmly established," Satin said. "However, it is extremely unlikely that the nominal licensing arrangements would ever be a barrier to the uptake of this technology."

Morton Satin sees coconut water as a natural contender in the sports drink market (*see our table comparing the composition of coconut water and a leading commercial brand*). "Just think of it," he said. "What could be better than a natural beverage product with the delicate aroma, taste, drinking characteristics and nutritional value of pure, fresh, tender coconut water, plus all the functional characteristics required of a sports drink?"

### **Bottled energy tastes good, too**

In one hour of sustained physical exercise, the body can lose up to three quarts of water through perspiration. In that water are small amounts of "electrolyte" minerals - mainly sodium but also potassium - and carbohydrates (sugars), whose loss leads to fatigue. For most of human history, the remedy to fluid loss was simple: drink water. But since the 1960s, sporting enthusiasts have an alternative - the "isotonic drink", containing not only water but electrolytes and other minerals, plus vitamins, complex polymer carbohydrates and amino acids.



Debate has raged over whether these liquids - commonly called "sports" or "energy" drinks - are any better than a balanced diet and water in sustaining physical performance.

But that has not stopped enormous growth in demand - sports drinks are now the most rapidly expanding sector of the Western world's soft drink industry, with at least a third of American adults being regular consumers.

Marketing wizards have an explanation for the triumph of sports drinks over plain water. Tests have shown that, after intensive exertion lasting more than an hour, their consumption is beneficial. But in addition, they taste much better: a recent study found that sports drinks come in more than 30 flavours, including from apple, banana, cherry, ginger, ginseng, lichee and mango. It appears none is coconut flavoured - yet.

- Visit the home page of AG's [Agricultural and Food Engineering Technologies Service](http://www.fao.org/ag/magazine/9810/spot3.htm)