



Coconut Risk Management and Mitigation Manual for the Pacific Region



Compiled by R. Bourdeix, J. M. Sourisseau and J. Lin Suva, December, 2021



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29. PALATABILITY AND PRACTICALITY OF COCONUT PRODUCTS

By R. Bourdeix and J. Lin

Description

The risk is that, if coconut products lack or lose good taste, or are unpleasant to use, this can lead to loss of interest among consumers and to an overall reduction in consumption of coconut products which will negatively impact the entire industry.

The global markets for high-value coconut products are currently expanding, strongly driven by coconut water and VCO. It is highly likely that in the future these markets will become more and more competitive. Producers, processors and exporters will have to make a difference by ensuring and maintaining a high quality of their products. The way coconut palms are cultivated in respect to environment and health of consumers, the special characteristics of the varieties which are cultivated, and the notions of 'terroir' or 'branding by origin' will become increasingly important in marketing coconut products. At it is impossible to include all coconut products in this manual, we focus only on four products: mature coconut, water, sugar and virgin coconut oil.

Occurrence and severity

From a western point of view, mature coconut fruits can seem user-unfriendly. The fibrous coconut husk is hard when mature and generally it is impossible to manually remove it. According to Wilson et al. (2018): 'The shell is also hard and can be quite dangerous to break if a suitable tool is not used. The kernel is strongly attached to the shell. It remains often too thin, firm and fibrous and sometimes its consumption can harm gums. Thus, there remains considerable work for breeders to upgrade the coconut palm to the status of a fully domesticated species.'

Regarding tender coconut harvested for water consumption, the husk is too thick, and the water makes up only 15 to 26% of the total fruit weight. The water properties such as flavour, aroma, and taste are easily altered, soon after it is extracted from the fruit by collecting the water in a clean container. The stage at which coconut are harvested for water differs from one country to another, and according to coconut varieties. In Sri Lanka, most of the King coconut sold for drinking in the street are cut long before they reach their sweetest taste, but it seems this is the way Sri Lankan like it, much to the regret of some tourists.

There is a need for a method of preparing coconut water that sterilizes the product and yet maintains its flavour and nutrition. The shelf-life of coconut water can be improved by eliminating the enzyme that causes degradation of the quality, i.e., polyphenol oxidase and peroxidase enzyme. Heat treatment such as pasteurization and Ultra Heat Treatment may inhibit the growth of these enzymes although can result in the loss of coconut water's unique and desirable properties.

Some companies are marketing mature coconut water or a mix of mature and immature coconut water, and do not indicate it clearly on the packaging of the beverage. Coconut water is sometimes diluted with normal water; sugar and other components added to adjust acidity and taste. Packaged coconut water is mostly sweetened, accounting for 75% of the packaged coconut water market. Flavoured products are the newly emerging market segment. In 2014,

flavoured coconut products dominated new product launches, accounting for nearly 68% of total launches led by mixes with pineapple, green tea, mango and orange.

Pasteurization slows the growth of bacteria (or kills it altogether), thus extending a perishable beverage's shelf life. Most coconut water is pasteurized via one of the following methods.

- HPP: A form of 'cold' pasteurization in which a packaged beverage is submerged under water and subjected to high pressure. Harmless Harvest uses this form of preservation.
- Flash Pasteurization: A beverage is heated to 71° to 74°C for up to 30 seconds. Most brands mentioned herein use this process.
- Ultra High Temperature Pasteurization: Often used to sterilize milk, a beverage is heated to above 138° for a couple of seconds. In this manual, the brand Zico was the only one that used this process.

In Thailand, processors use microfiltration of coconut water, and the fact that the water sometimes has a pink colour is integrated in their marketing as a natural fact. In Dominican Republic, large companies tried microfiltration, but they did not like it, as the water obtained lost the slightly opalescent characteristic, specific to coconut water, and looked just like plain water. We do not have evidence that the micro filtration processes used in Thailand and Dominican Republic are the same. The industrial processes for coconut water are often kept secret by the large companies.

For virgin coconut oil, the only quality criteria used in the Pacific region are free fatty acid and the moisture content. The quality of VCO produced in Pacific countries is sometimes insufficient for export because the coconut meat is shredded and heated. In Southeast Asia also, a recent study investigated the keeping quality of commercial virgin coconut oil (VCO) and the probable cause of its quality deterioration. Fourteen brands of commercial VCO and a fresh prepared VCO were used. The results indicated that 10 out of 14 commercial VCO had objectionable odour and taste, clearly detected by panellists. This study confirmed that once the VCO undergoes brief photooxidation, subsequent protection using light barrier packaging material will not be effective to inhibit quality deterioration during trading, display, or storage.

Personal observation of Dr R. Bourdeix indicated that coconut sugar from different countries differs in palatability. A few controlled contaminations by natural bacteria help to fully develop the aroma of coconut sugar and syrups. On the other hand, if coconut sap is too contaminated by bacteria, the sugar can no longer crystallize, and the sap is generally used to make toddy honey, as practiced for instance in Kiribati.

Mitigation and adaptation

The International Coconut Community (ex APCC) propose quality standards for seven coconut products, including virgin coconut oil. In addition to moisture and free fatty acids, VCO standards take also into account the colour, the iodine value, and the saponification value. Food additives are not permitted, and packaging must also follow some rules. See below.

When marketing, consider cultural specificities. For instance, we conducted a full blind test in Vanuatu comparing several varieties including the Aromatic Green Dwarf (aromatic taste of the water), the Brazil Green Dwarf (said to be the sweetest variety) and the Vanuatu Tall (nothing special). Ni-Vanuatu people appreciate the aroma of the Thai variety, the sweetness of the Brazilian Dwarf, but their blind preference is for the Vanuatu tall.

The mild flavour of coconut water is something accepted, and part of the marketing focus. One of the qualities of coconut water is its relative lack of flavour, together with the subtleties of its aroma and its low calorific content. A new method based on Raman spectroscopy has significant potential for the detection of adulteration of fresh coconut water by dilution and its masking with sugars. This may help to assess the quality of coconut water.

Some internet sites dedicated to health have recently attacked nine main brands of coconut water. They argue that manufacturers have adopted several methods of packaging that ruin its purity: Adopting water from mature coconuts, using reconstituted concentrate instead of fresh coconut water, pasteurizing coconut water with heat, adding preservatives to flavour and sweeten coconut water, and dipping coconuts in chemicals for transportation.

In Fiji, there is a great opportunity to market the water of a special Green Dwarf coconut. Its water is quite sweet and tasty, and naturally pink in colour. In this this case the marketing could be built on the medicinal properties traditionally associated with such coconut palms having the 'Pink colour' of young husk and water.

Actions to undertake

A global study is needed on the taste and smell of virgin coconut oil from various origins. Sensory evaluation provides important quantitative and qualitative data that aids in product development and influences marketing and business decisions. The use of highly trained sensory panels can eliminate bias that often results from consumer panels; however trained panels are expensive and require training. Analytical techniques provide measurements of the stability and quality of oil and fat-based foods, including oxidation measurement. Often, the best estimates of the quality of oils and fats are evaluated by using a combination of sensory and analytical methods.

Coconut products should be better marketed and branded by variety rather than only 'terroir'. This could be a very precious tool, even if presently the industry is often running after each and every coconut they find. As far as we know, there is presently only one case of branding a coconut cultivar. The Thai coconut variety named 'Ham Hom' is famous for aromatic water. It has now gained international acceptance and, as described in risk description n°32, it has become the 'juiciest' coconut business. The Tahiti Monoï is made only from coconut growing on atolls soils of French Polynesia; it is branded by geographical origin but not by variety. It faces more commercial difficulties with competitors.

Before the varieties disappear, there is an urgent need to find, collect and describe local aromatic coconut varieties existing in the Pacific region. The most convenient way to find such variety is to organize a coconut contest, as advised in risk description n°14.

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