

The Apung Palm: Traditional Techniques of Sugar Tapping and Alcohol Extraction in Sarawak

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In Sarawak the nipa palm, *Nypa fruticans* Wurmb, is commonly known as *apung*. It occurs as a narrow fringe along the banks of many minor rivers but may form dense stands, usually with some admixture of mangroves, covering extensive areas of mud flats in some of the larger estuaries. The palm is an important forest product because its various parts are utilized traditionally by the local people particularly Malays. Nipa exploitation in this East Malaysian state is mainly for sugar and alcohol extraction. The areas fringing the tidal river banks of the Batang Samarahan (stretching from Sambir to Tambirat), Batang Sadong (in the Pendam-Sebangan area), Batang Saribas and its tributaries (around Pusa and Spaoh) and Sungai Kerian (at Kabong) represent the major sugar producing districts. The sugar or *gula apung* is sold to consumers in various parts of the state and also to three distilleries (two in Kuching and one in Sibu) which make use of both refined and nipah sugars for production of alcohol and local wines. Longhouse communities use the nipa sugar for making an alcoholic drink referred to as *chap lingkau* or *arak*.

The nipa palm does not bear flowers all the year round, the flowering season being between June and September. Due to varying climatic conditions which fluctuate from one year to the next, the palms may flower as early as May or prolong into the month of October. There are two tapping seasons. The first season is the tapping of the *mayang*, the colloquial term for inflorescences

about 1½ months old before the fruits are formed, and the other is the tapping of old inflorescences bearing fruits of 4 to 5 months old. The term for these infructescences is *termantu*. The tapping season for *mayang* lasts about 3 to 4 months commencing in July. The tapping season for the *termantu* usually commences around October or November and may end just before the next flowering season. Prior to tapping a massaging treatment or *goncang* that involves regular bending and twisting of the stalk is required. For the *mayang*, the tappers usually shake and lightly beat the flower stalk once a day (usually in the morning) for about four consecutive days before it is tapped the next day. In the case of the *termantu*, it is shaken and lightly beaten once a day about three to five consecutive days and then left for a week. This is repeated for two more times before the infructescence can be tapped, the whole procedure requiring about a month. The massaging is said to increase the flow of sap since it prevents the cells from hardening and atrophying as the stalk matures. One inflorescence stalk can flow (produce sap) for about two to three months depending on the length of the stalk; naturally the length of the *mayang* is shorter than that of the *termantu*. Yield of sap is sensitive to atmospheric humidity. Yields are high when transpiration takes place to a lesser degree on dull and cloudy days or in the night when relative humidity values are higher and temperature drops.



1. Nipa swamps in Sarawak, East Malaysia. The palm grows extensively along tidal river banks often as narrow fringe vegetation.

Tapping means that the inflorescence/infructescence stalk is cut and the sap that exudes is collected. Normally the stalk is scraped clean of fallen debris before a cut is made about 10 cm behind the head. A bamboo joint is then placed with the cut end of the stalk inserted through a hole at its side to collect the sap as it flows. The joint is further installed in a vertical position by means of a stick support. During sap collection usually in the morning, the tapper pares a very thin slice off the cut end and repeats this once more in the evening to keep the wound fresh and to facilitate exudation. On average the number of inflorescences/infructescences tapped varies from 145 to 272 per day. In Tambirat where most of this information was collected, one person working the whole morning can collect up to 180 bamboo joints as well as replace them with fresh/clean joints followed by retapping. Actual collection starts at 7:00 A.M. and ends at

10:00 A.M. As the sap arrives (each time about 20 to 30 bamboo joints packed into a rattan basket known as *ambin*) at the processing center, the sap is poured into a huge open pan or cauldron called the *kawah* which is placed over an earthen furnace or *keran*. A full *kawah* can hold 120–130 liters of sap. The bamboo joints emptied of sap are normally placed upside down on a shelf (or *para*) built above one side of the fire place to drain off remaining liquid and to dry by the heat from the fire. The furnace is fuelled by mangrove firewood. As more sap is poured into the pan a circular structure made of bark or sometimes hardboard is placed on top of the *kawah* to prevent the foam from overflowing as the sap boils. The circlet of bark is known in Malay as a *subang* or *keling-kang*. At times the white foam that rises during boiling to the top of the liquid in the *kawah* is skimmed off into jars where the solution that results ripens to vinegar



2. Close-up of the developing inflorescence known as the *mayang* to the local Malays. 3. The *termantu* or infructescence with maturing fruit head. 4. The inflorescence cut and inserted into a bamboo joint through a hole at its side. Sap that exudes from the cut end collects into the receptacle. 5. This lot of bamboo joints, in a rattan basket known as *ambin*, is taken along on each sap collection trip to replace those installed on tapped palms the day before. About five to six trips are made in one morning.

after a few weeks. During the heating process which lasts from 7:00 A.M. to 12:00 noon or sometimes as late as 2:00 P.M., constant stirring is required to facilitate evaporation and transformation into a dark yellowish or brown paste. The *kawah* with the paste is then removed from the fire and placed on the ground where it is further stirred for another half to a full hour with a special coconut scoop or *senduk*. A full pan of sap makes about 18–20 kg or $\frac{3}{4}$ of a biscuit tin (18.2 liters capacity) of sugar. Good quality sugar made in this way is hard, dry, light brown to almost yellowish in color and sweet to the taste. On the other hand, sugar of poor quality is soft, watery and sometimes has a sourer or bitter taste. The sugar is called *gula apung*.

Alcohol is prepared by local people living in longhouses from a mixture of nipa sugar and fermenting rice wine known as *tuak* which is a much-liked alcoholic beverage. About 3.6 kg—the equivalent of the local weight measure of one *gantang* of rice—is cooked and then cooled before mixing with 0.6 kg (or one *kati*) of yeast. The mixture is fermented in earthenware jars for about two weeks. At the end of this initial fermentation period, *tuak*—the whitish liquor obtained by squeezing the fermenting mixture through fine mesh and having it filtered—is produced. The fermenting rice mixture is now stirred into an aqueous solution of nipa sugar prepared in the proportion of 24.2 kg (40 katis) of sugar in 109.2 liters (or 6 biscuit tins) of water and left to ferment for another six days. The resulting fermented liquor is transferred to a 200.2 liter (44 gallon) capacity drum for distillation. The drum is filled up to one-third of its capacity and heated over a low wood fire for 3–4 hours. Vapors rising from the liquor condense on the underside of an inverted cone placed over the drum. The cone is filled with water and thus acts as a condenser. The distillate, dripping from the vertex of the inverted cone, is collected in a concave receiver

which drains via a bamboo pipe into a bottle. Usually a second distillation is carried out on the cooled stillage from the first distillation by adding more yeast (about 36 g) and nipa sugar (about 3 kg) and allowing the fermentation process to continue for four more days. The alcoholic drink produced is known as *lingkau*. Yield is approximately 13% volume by volume from 27 kg of nipa sugar or 22 bottles (of 0.65 liter each) of *lingkau*.

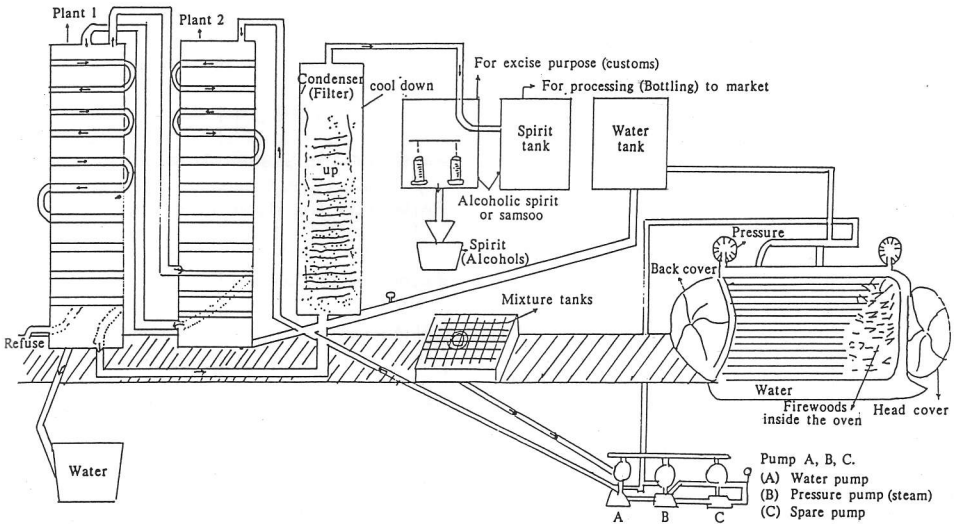
In local distilleries, such as the one in Kuching which provided information, the preparation of alcohol from nipa sugar does not include the initial fermentation stage with cooked rice carried out by the natives. In a one-batch operation, about 675 kg of nipa sugar are dissolved in about 4,546 liters (1,000 gallons) of water in a concrete tank measuring 2.1 m \times 2.2 m and 1.2 m deep internally. About 4.5 kg of active dried yeasts made into an aqueous solution are then added to the mixture in the tank. While the mixture ferments at room temperature for the next 4–5 days, the tank is covered with wooden planks. No strict temperature control is observed although on a hot day the planks are removed to stabilize the fermenting mixture. The distiller recognizes two crude tests of complete fermentation: a subsidence of foam or a fall in temperature of the mixture. The liquor now contains alcohol and water with acetic acid as an impurity. In the factory a series of these tanks with fermenting mixture is connected by a pumping system to a reservoir from which the still is fed. The fermented liquor is filtered as it flows into the reservoir. The stills are actually two closed columns fitted with perforated plates at intervals and steam is fed from the bottom. The steam is supplied by a tubular boiler burning mangrove firewood. The fermented liquor is pumped to the top of the columns where it trickles down through the plates. The dry steam passing upwards volatilizes most of the alcohol and some of the water, which then passes up the column through the perfo-



6. The labels of some of the special wines produced by Si Hup Distillery in Kuching.

rations. As it moves upwards, the water vapor condenses with some of the alcohol vapor and drops down again to be met by more steam and revolatilizes. For more

complete separation, the mixture of vapor and wash may go through the final column twice until the wash reaching the bottom of the column is free from alcohol. The



7. Original layout plan of the distilling plant. (Courtesy of Si Hup Distillery, Kuching.)

spent wash then passes out at the bottom of the column while the vapor (alcohol) reaching the top is almost free from water. The latter is led through a condenser unit and the distillate piped to outlets for collection. The alcohol goes into a mixing tank where herbs or other ingredients are added in the preparation of special wines. The final product is bottled. The steam distillation takes about 4–5 hours and the rate of distillation is between 135–230 liters per hour. Yield is lower compared with that obtained by local people's stills, i.e. 11% or about 50.0 liters from 675 kg of

sugar. The alcohol, however, is of better quality being normally 130°–140° proof (the *proof scale* is about double the percentage of purity e.g. 100° proof alcohol is 57.19% alcohol according to U.K. standards).

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