THE MANUFACTURE AND CHARACTERISTICS OF CEYLON ARRACK—I

By W. R. N. NATHANAEL, Chemist, Coconut Research Institute.

INTRODUCTION

WIDELY scattered through scientific and technical literature are many facts and figures concerning alcohol, which are of interest in one way or another, not only to the professional chemist and the scientific investigator, but also to the manufacturer, engineer and the user of automobiles.

The industrial utilization of comparatively recent times, ' ociation with conviviality, and its use as an inebriating liquor, dates back to a very rei period in history. It is claimed for instance,¹ that arrack distilled from toddy has been known in India, since at least 800 B.C., and in Ceylon from "time immemorial."

The custom of spirit drinking in the East is widespread, and cannot be regarded as an adaptation of a European habit. Multitudinous substances have been employed in various countries of the Orient for the preparation of alcoholic liquors, and in fact, the means of procuring fermentation in a saccharine or malted liquor have been for long, much more extensively understood in the East, than in Europe generally.

ARRACK MANUFACTURE

According to some authorities the name arrack is derived from the Arabic word "araq" meaning "sweat, juice or perspiration." According to others² it is derived from the Arecanut (the so-called betel-nut palm of tropical Asia), from which a variety of arrack is known to have been prepared for a long time. The term arrack, as designating a distilled liquor, however, is now employed in a generic sense to a variety of spirituous liquors, distilled from a diversity of raw materials such as ground rice, molasses, mahua flowers (Bassia latifolia or the honey tree) and various palm juices.

Ceylon arrack is an alcoholic beverage manufactured by distilling fermented toddy, tapped exclusively from the tall variety of the coconut palm--Cocos nucifera, Linn.

Historical

Though authentic references to coconut products like toddy and arrack appear in Ceylon's historical records only about the 5th Century A.D., yet it is believed that the tapping for toddy and the distillation of arrack had been practised in the Island for long ages.

Undoubtedly, small plantations of coconut did exist in Ceylon during the times of the Sinhalese Kings, but it is known that a distinct fillip was given to the extension of cultivation of the palm, and the development of the arrack industry, only after the advent of the Dutch in 1658.

According to Bertolacci,³ when the British took over power in 1802, the entire coastal plain between Chilaw and Matara was an uninterrupted coconut plantation, indicative of the progress made under the Dutch. Actually, the arrack industry of the Island too, had expanded to considerable dimensions at the beginning of the 19th century. Whole areas were set apart for no other purpose than that of procuring toddy, and the distillation of arrack took place at every village round the coast. Figures quoted by the same author show that a remunerative overseas arrack trade had been established about this time, the great markets being Penang, Singapore, Madras, Bombay, Malabar and the Coromandel Coasts.

The average exports of arrack from 1806-1813 are quoted as 790,397 gallons, the peak years being 1810-1812, with an average of 939,112 gallons. These figures are exclusive of "coastways" exports of 37,500-93,000 gallons per year, for consumption in other parts of Ceylon. After the year 1813 the export trade in arrack suffered a steady decline. This set-back was partly due to restrictions, tariff hostilities and excise duties levied by the importing countries, and partly due to Batavian and Coromandel arrack competing with the Ceylon product in the same markets. Steadily diminishing quantities continued to be exported throughout the last century, and the year 1910 really saw the extinction of Ceylon's arrack trade with countries abroad.

The Excise Ordinance of Ceylon was promulgated in 1834, which laid emphasis on revenue considerations, whilst temperance objects receded to the background. Gradually a uniform excise system was made for the whole country, and laws were tightened so as to prevent the manufacture of arrack except on permits. Doubtless, this licensing system became a source of revenue to Government and ultimately gave place to a Government monopoly in the sale of arrack.

The Excise Department of Ceylon was established in 1912, and a new policy was evolved by Government in 1924 for controlling the methods of manufacture and improving the quality of arrack. Prior to 1924, arrack distillation was carried on in about 250 dirtily kept country-made copper pot stills of a primitive type. These production units were not big and were put up by small capitalists. They had an annual capacity of about 1,200,000 proof gallons ($57 \cdot 1\%$ alcohol v/v) of arrack and were situated near the coast between Madampe and Dondra. Browning and Symons⁴ have commented on the inferiority of the spirit made in the old way, using these pot stills.

The Government policy of taxation gradually squeezed out of existence the small manufacturer of arrack, and after 1924 these small factories were superseded by eight large modern distilleries, with up-to-date machinery, situated in the Kalutara District. Three of these distilleries had Barbet Patent Stills for continuous distillation, each capable of producing 1,000 gallons of arrack per day. Though mostly all these distilleries were privately-owned, yet operations in them had to be conducted under Excise supervision and the arrack supplied on contract to Government. Excise officers were then responsible for storing, maturing, blending and bottling.

Today, in addition to eight private distilleries, there is a State Distillery (erected in August, 1949, at Seeduwa in the Western Province) and also a Co-operative Distillery opened in 1951, in the Kalutara revenue district.

The Excise statistics for 1952^5 show that 242,820 coconut trees had been licensed for arrack manufacture, and the total volume of arrack produced in 1952 by the ten distilleries is given as 1,152,113 proof gallons ($\equiv 1,920,188$ gallons of arrack at the present issue strength of 40° u.p.). Note. -40° u.p. $3\equiv 4\cdot 3\%$ alcohol (v/v).

Nature of Raw Material

As the writer, in some of his previous articles in this journal⁶ has described exhaustively subjects like the composition of toddy, its tapping process and yield, it is not considered essential to discuss these aspects of the raw material once again. It might, however, be emphasized, that the quality and composition of the toddy used for distillation are really of greater importance than the exact details of manufacture, in determining the characteristics of the finished product.



A Tapper with his gear

In this context, certain figures given by Browning and Symons (loc. cit) are of interest, because they give an indication of the range of composition of coconut toddy as normally procured. They appear to have examined a considerable number of samples in various parts of the Island, as sold over the counter of toddy taverns, and also in the topes (gardens), where the tapping takes place. The following analytical results representing 50 samples have been quoted :—

		Range	Average
Specific Gravity	 	0 • 998 1 • 0 3 3	 I .015
% Acidity (as acetic)	 	0.32 -0.67	 0.21
% Alcohol (by weight)	 	2.7 -5.8	 4 • 2

Though the variations in composition evident in the above figures are primarily due to the fact that we are dealing with a vegetable juice in various stages of fermentation, yet the different climatic and soil conditions in the Island could also doubtlessly affect the product to a certain extent.

The difficulties experienced in the past in standardizing the quality of Ceylon arrack, could in a large measure be explained, when we consider the fact that the composition of the raw material itself could fluctuate within a fairly wide range, in the absence of a certain amount of control.



A Tapper climbing a palm

METHOD OF COLLECTING TODDY FOR ARRACK MANUFACTURE



Tapper on his way up



Tapper passing from palm to palm



Toddy being bulked at a collecting station



Tapper at work on top of a palm



Toddy being lowered in pots



Bulked toddy being delivered at distillery

Cöllection of Raw Material

When the unopened inflorescence (or spathe) of the palm is nearly ready to produce toddy, the tapper cuts off a small portion from the free end of it and places an earthenware pot (of about 4 litres capacity) on the end, which remains supported by its own weight. The collecting pot is usually left on the tree for 24 hours, at which stage the tapper climbs the palm, removes the collecting vessel, and pours the contents into a spare pot which he himself carries from tree to tree. He then lets this down by rope to the ground, where his assistant bulks the toddy into larger receptacles. The tapper then pares a thin slice off the end of the spathe, taps it with his mallet and replaces the collecting pot.

It is usual to tap two spathes on a tree at once, and the average time taken to pare away each spathe varies from 30-90 days, depending on the skilfulness of the tapper. In a toddy tope the trees which are being tapped are usually "coupled" together by ropes which enables one man to manage about one hundred trees a day. If, however, the trees have to be climbed individually then a single tapper could work in a day only about 35 palms.

The present methods of tapping and collection appear to have been in use in the Island for an indefinitely long period and in spite of certain minor refinements effected during the last 25 years, the way the raw material is handled at the topes still leaves much room for improvement. The toddy, for example, is usually drawn in the same pot day after day, and it is never brought down and washed or substituted during the eight months tapping season unless it happens to break. The pungency in flavour and smell associated with toddy, which makes it repulsive to most people, is doubtlessly due to putrefactive organisms which collect in the dregs after the pots have been in use for about a week. According to a report issued by the Government Analyst in 1917⁷, more than 35 kinds of wild yeasts and bacteria have been isolated from a sample of distillery toddy.

Prior to 1931 it was customary to send the toddy collected at the topes direct to the distilleries, but from that year a new system has been introduced by the Excise Department. Under this scheme (which is still in operation), toddy contractors are required to provide "collecting stations" to which the raw material is brought from the topes and there measured, before being transported to the distilleries. This method doubtlessly facilitates checking by Inspectors for quality and quantity, with the added advantage of preventing heavy leakages between tope and distillery.

The toddy from the collecting stations is next transferred into wooden barrels of about 100 gallons capacity which are then rolled along the roads to the distillery or are transported thither in carts or lorries.

Commencing from 1937, with the consent of the distillers, a system of graduated straining of the raw material has been evolved with success, which has now been made compulsory. The advantages to be gained by this practice have been confirmed by experiments which proved that strained toddy reached the highest alcohol content an hour or two before the unstrained product. It was also found that when secondary (or acetous) fermentation set in, the strained toddy lost less alcohol than the unstrained material.

The first step in the removal of these suspended impurities is now done at the tope itself, where wicker baskets are used for removing the grosser foreign matter. The finer particles are then removed at the subsequent straining operations which are carried out at the receiving tubs of the collecting stations, and again at the distilleries. In current practice, the toddy is passed

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through "staybrite" steel wire meshes of different gauges and ultimately through cloth. This method of straining excludes the so-called "ra-bath" (mostly vegetable tissues from the spathe) which is apparently useless, if not injurious to the fermentation process whereas the essential yeasts are not held back on the cloth. The toddy treated in this manner is definitely cleaner and more agreeable to taste and smell.

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