GRAPPA: CONSIDERATIONS ON THE ITALIAN TRADITIONAL DISTILLATION

VERSINI G.
Laboratory of Analysis and Research
Istituto Agrario Provinciale - San Michele all'Adige (TN), Italy
ODELLO L.
Œnologist, Brescia, Italy

DEFINITION (8)

According to the European Economic Community regulation, grappa is the spiritous beverage made in Italy from direct steam marc distillation or distilled after adding water to marcs.

Any use of liquids from pressing of pomace or washing it with water is forbidden. The greatest amount of wine lees which can be added to marc is 25 kg per 100 kg of the latter, corresponding at the most to 35% of the final alcoholic amount. The lowest volatile substances content of grappa is 140mg% ml a.a., while its highest methanol content is 1g% ml a.a.

Moreover, according to what the Italian law prescribes, the fermented product used in distillation must be genuine, sound, and distilled in such a way that all off-flavors are eliminated and pleasant flavors of fermented marc are kept. The highest proof of raw distillate is 86% v/alcohol and that of the commercial product must be higher than 37.5% v/alcohol and can normally reach 50% v/alcohol.

A BRIEF HISTORY (5, 7)

There are descriptions of alambics used in marc distillation in some 17th-century books, such as that of the Jesuit and agronomist from Perpignan, Miquel Agusti (1617), and that of the German Jesuit Atanasio Kircher, who kept correspondence with Francesco Terzi Lana, a nobleman from Brescia.

Grappa distillation had a secondary role compared to that of wine up to the 19th century. In fact, there was a large production of cheap, low quality, low proof wine easily damageable, part of which was distilled. This is testified in many notarial and trial documents also in Trentino where the name acquavite is found meaning wine distillate. It is worth mentioning that the oldest Italian marc distillery, located in Bassano del Grappa, a famous Venetian town, was grounded in 1779 by Mr. Bortolo Nardini. He was born in and came from Cembra Valley, a steep valley in Trentino traditionally famous for its numerous small distilleries.

In the 19th century, the introduction of the rectifying column and continuous distillation equipments lowered the costs of the distillatory process and favoured the use of marc diffusion liquids. This new technology spread in many European countries, except for Italy, where direct distillation was still in use and new discontinuous alambics together with different continuous equipments were conceived and built.

As it can be read in an original statistical report of the Association of Commerce and Industry of Rovereto, in Trentino, 761 alambics for pomace distillation were operating in this area during the years 1879 and 1880. Farm distilleries which produced less than 112L of grappa and for this reason did not pay any taxes on their products were not considered in the number mentioned above.

MARC ENSILAGE (9, 11)

The use of this raw material in distillation implies certain difficulties: preserving marc and avoiding off-flavors originated during ensilage and distillation. Particularly in the last 20 years, the unfermented marc percentage at the moment of ensiling has gradually increased. This fact calls for a good glucidic fermentation. Traditionally, marcs are ensiled into horizontal tunnels or into big concrete earthedup tanks. In order to get a better, and limited in amount, varietal selection and ensilage of marcs, steel containers are used with a mobile lid on their top or plastic bags. Marcs are pressed into such containers, which then are closed tightly to limit the presence of oxygen and so also that of acetic spoilage. The liquid that eventually remains on the tank bottom is taken out, stored in another tank, and usually added to marcs at the moment of distillation, or strongly acidified and sprayed on other marcs during their ensilage to lower the pH level. This last new technique has been developed at the Istituto Agrario Provinciale (11) and is spreading in other Italian regions. The technique facilitates a proper glucidic fermentation and the preservation of the fermented substance. It also improves considerably the organoleptic quality of marc and also of the distillate.

TRADITIONAL EQUIPMENT (1, 3, 6)

DIRECT FLAME ALAMBIC

The direct flame alambic is the oldest equipment still in use for small farm productions. It is formed by a small or medium-sized copper boiler which normally presents, on its upper part, a hat connected with a swan's neck and a hatch through which marcs are introduced. A cylindrical, large, and short pipe with a hermetic seal hatch is placed at the bottom of the biggest equipment to expell exhaust matter. Usually, the boiler is located inside a wall structure and heated by a wood or gas burner. An amount of water equal to that of marcs is added, and the boiler is filled 2/3 of its volume. It is possible either to carry out a double distillation or to insert, detatched from the boiler and placed beside it, a rectifying column equipped with few bubble-cap plates (usually from 5 to 9) ***[fig. 1]***. At times, the column top ends with a "hat" into which cold water circulates and which regulates dephlegmation. The hat contains a series of small parallel tubes in a cold water bath. Inside of these tubes the distilled vapors are cooled. This kind of alambic is called "cold head" alambic.

According to the variations of proof level, which can be read on the hydrometer port inserted at the end of the coil, the heads cutting is made (usually between 70 and 80 degrees)

and the tails cutting (after the decrease of the proof level between 35 and 50 degrees). These fractions are conveyed in a barrel-shaped container (fusel box), put again on the bottom of the distillation column at the end of distillation, and recycled.

After a number of recyclings or depending on some marc off-flavors the fractions are eliminated and conveyed into a hermetic seal container.

It usually takes between 3 and 5 hours to carry out the distillation process. A proper distillation implies remarkable skill. It sometimes happens that inside alambics a portion of marcs get burnt, the so called "fire stroke." Generally this happens when marc skins are frail and thus reduced to a mush or when too many wine lees are added. In the past, this kind of accident was avoided by putting straws on the bottom of the boiler; today marcs keep being slowly stirred by a bent-bladed implement which fits the bottom of the boiler. Because of such technical problems, today the use of the direct flame alambic is extremely limited.

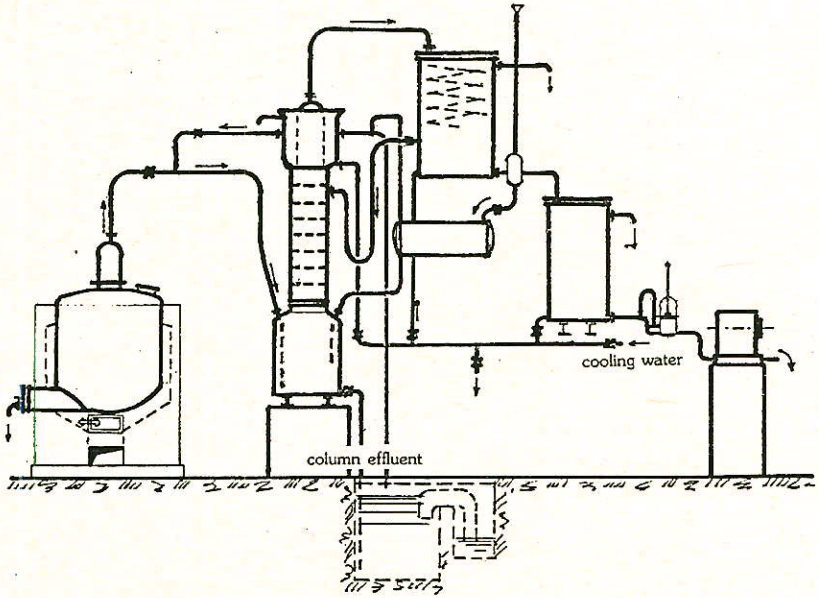

Fig.1 : Scheme of a direct flame alambic

WATER BATH ALAMBIC

Except for an interspace around the boiler where water is heated by a gas burner or hot vapor is inflated, this alambic derives directly from the direct flame alambic. In some cases, it is possible to inflate hot vapor directly into the boiler to have a faster initial heat increase and a faster alcohol exhaustion at the end of the distillatory process.

Distillation with the water bath alambic is a quite regular process. This equipment, too, has a rectifying column placed on one side of the boiler and an implement which stirs the mixture being distilled. The capacity of a boiler varies from 500 to 2500 liters.

The proof of the final distillate reaches from 60 to 75 degrees; and takes about 3 hours to bring the process to an end. It seems that this distillation method, though rather time and heat consuming, can produce fine quality distillates. For this reason, the water bath technique, typical of and often employed in Trentino, has been slowly spreading over many other Italian regions ***(fig. 2)***.

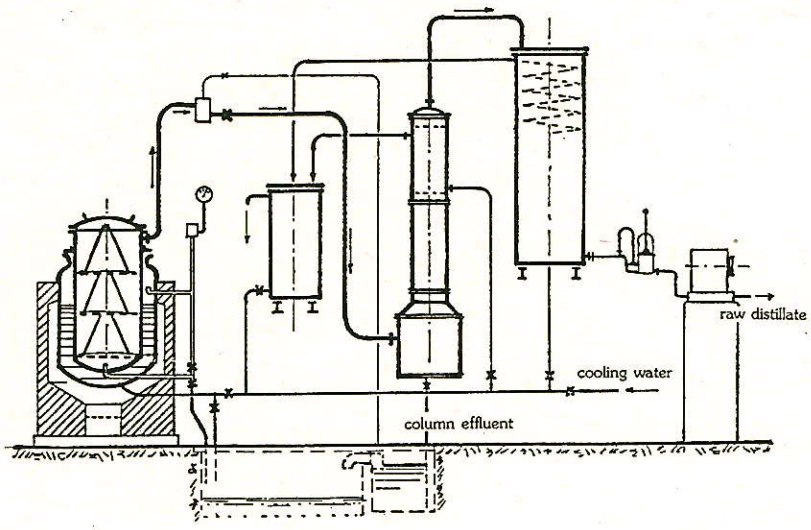

Fig. 2 : Scheme of a water bath baskets alambic

DIRECT STEAM ALAMBIC

This alambic is the continuation and evolution of the batch distillation equipments belonging to the 19th-century tradition. More than half of the alambics employed in Italy nowadays are of this kind.

It is made of a series of small overturned conefrustum-shaped copper boilers (or steel ones) which hold from 150 to 400kg of marc. On the upper part of the alambic there is a hermetic seal hatch. A pipe inserted on one side of the boiler conveys phlegm vapors to the rectifying column. A steam injector is connected to the bottom of each boiler. Marcs are loaded into special copper or steel baskets which are laid one upon the other and serve to prevent marcs compression and to facilitate marcs unloading. Steam passes through marc and strips the phlegm ***(fig. 3)***. Regulating the steam flux requires a very skillfull handling because it is necessary to avoid the formation within marcs of preferential vapor courses which would result in an irregular distribution of the flux on marcs. When the vapor flux temperature and pressure are relatively low, the equipment can be considered as a water bath baskets alambic.

Distillation with the direct steam alambic is a somewhat irregular process which undergoes several oscillations and lasts from 1 to 2 and a half hours depending on the vapor flux.

In order to increase the alambic productivity there is a tendency to use two or more boilers, some of them being employed in distillation and the other ones in the loading process. This procedure is called Da Ponte, its ideator's name, and derives from the one called Comboni.

Another procedure, the so called Erba, differs from that just mentioned in that it does not have any rectifying column; phlegm vapors pass from one boiler to the other through openings and the boilers therefore work also as plates of a rectifying column.

A comparison, made among Trentinian products, between water bath alambic distillation and direct steam alambic distillation (2, 12), evidenced a greater amount of long chain fatty acids and of their ethyl esters in the raw distillate produced by direct steam equipments (10). It is however worth remembering that the chemical and organoleptic characteristics of grappa are greatly influenced by two factors: the alambic being employed and the distiller's way of handling the distillation process.

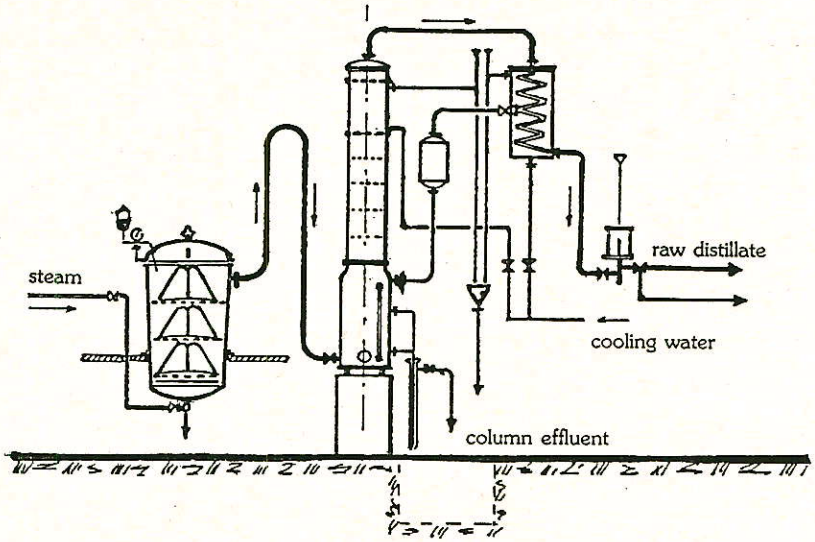

Fig. 3 : Scheme of a direct steam alambic

During their work, all distillers have in some way modified their own equipment: as a result, of the nearly 100 alambics still producing grappa in Italy, no one quite resembles the other. Perhaps, what has prevented continuous equipments from being installed on a large scale is really the distillers' love for their work.

Concluding this brief explanation of the most interesting traditional systems of Italian batch distillation, it is important to remember that, in Italy, the whole distillatory process is under strict governmental control. The organ which holds such office analyses distillates and certificates their right quality before further processing takes place. Usually, the preparation of commercial products consists first in the addition to raw distillate of oligomineral or demineralized water, and eventually of those substances allowed by the law; and secondly in the refrigeration (between 2 and —4°C to about —20°C) and filtration on of the refrigerated, diluted distillate.

The quality of a product is ensued by the law. Associations among producers guarantee the Geographic Appellation and the peculiarity of their products. Of fundamental importance in the quality assessment of grappa is the organoleptic examination of distillate samples. In Italy, nowadays there are more that 700 members of the ANAG Association: trained grappa tasters who attended a course and took a final exam organized by the association itself. An ANAG degustation test (4) —this is the first codified degustation test for spirit known to a vast public consists either of an evaluation procedure based on ordinal scaling by points or of another based on unstructured graphic line scaling. Both these sensory analyses take into account the same several characteristics of a grappa sample: its aspects, the intensity, finesse,

and soundness of its smell, the harmony of its taste, the fragrance and persistence of its after taste, and its belonging to a particular category of distillate (young, aged, aromatic, or aromatized distillate, etc.).

The progress achieved in the efficiency of marc ensilage systems, distillation, and final processing, has resulted in new and interesting qualitative levels of grappa.

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