

THE Rum UNIVERSITY

Rum Appreciation In The 21st Century

Lesson V



Lesson V: Distillation Methods Part II: Column Still Rums

Vocabulary Primer

Fusel Oil: From the German “Fusel” or “bad liquor” first used around 1850. Webster’s dictionary defines it as “An acrid oily liquid occurring in insufficiently distilled alcoholic liquors, consisting chiefly of amyl alcohol, and used especially as a source of alcohols and as a solvent.”

Distillation Column: A tall metal cylinder internally fitted with perforated horizontal plates used to promote separation of miscible liquids ascending in the cylinder as vapor.

History of the Still

In the early part of the 3rd Century lived a great chemist known as “Maria the Jewess” who, for the most part, has remained lost in the history. Most of the recorded information about her comes from the Egyptian alchemist Zosimos. Among other things, Maria is attributed with inventing the “kerotakis,” which is the earliest form of double-boiler recorded in history. The kerotakis consisted of a boiler for mercury or sulfur and a warmer plate (for melting copper or lead) that would be heated by the vapors emanating from the boiler. Double boilers are one of the simplest form of stills.

Perhaps the only reference to Maria in the modern world comes to us from the culinary world, by way of the French expression for double boiler “bain-marie” (or “baño María” in Spanish) which means “Maria’s bath.”

Maria gave us far more than a double boiler, she founded an important school of chemistry, which some have traced to be at the roots of today’s Chemical Engineering. She was known as “The Jewess” because Zosimos called her a “Sister of Moses.” That expression could have been no more than a way of saying she was wise, so scholars speculate on her origins.

Despite her work with metals, Maria wasn’t really an alchemist. She was less interested in the philosophy of transmutation than she was in practical chemical processes (she invented the process for making silver sulfide, a substance commonly used by metal artists, also called “niello”). The alchemists of a later age used some pretty fanciful and metaphorical language to describe her stills and processes, but that was their rhetoric, not hers.



Continuous Distillation Columns

The method of distillation employed in the production of rum has a great effect on the body and characteristics of the rum. Heavy rums are typically produced by batch (pot still), while light rums are normally produced by continuous distillation.

As you may recall from Lesson IV, when you distill rum using a pot still you do so in “batches.” Work is required between batches to clean up and prepare for the next session. When you are trying to distill a very large amount of rum, you have the option of employing many large pot stills or to use a column still.

Column stills are made up of distillation columns arranged in a series, each feeding the next. As little as two and as many as four columns may be arranged in this fashion, the more columns the cleaner the resulting alcohol will be. Because of their construction, column stills allow for the continuous feeding of fermented wash (or “beer”) into the first column, and are thus commonly referred to as “Continuous Distillation Columns”. In addition to the time saved by not having to distill each batch individually, column stills also contain “concentrating plates” (or “fractional plates”) which allow for the removal of volatile sulfur compounds and other undesirable elements or “fractions.” The ability to remove fractions gives the distiller greater control over the characteristics of the final product. Because different compounds have different boiling temperatures, these collect on the concentrating plates located at different heights in the column.

There are many different types of stills, each a little bit different from the others. It is even possible to combine a pot still with a rectifying column. In general terms, however, it is common to see the following results when looking at the strength, volume and type of fraction extracted from a column with five concentrating plates (specific proofs and temperatures vary from still to still):

First fraction, distilled at around 70°C at a proof of about 90°GL represents about 5% of the total distillate volume. It consists mainly of unpleasant aldehydes, organic acids and esters.

Second fraction, distilled at around 75°C at a proof of about 93°GL represents about 10% of the total distillate volume. It consists mainly of ethanol with appreciable amounts of aldehydes and esters.

Third fraction, distilled at around 78°C at a proof of 95°GL represents about 55% of the total distillate volume. It consists mainly of ethanol with very small amounts of congeners such as aldehydes, esters and high alcohols.



Fourth fraction, distilled at around 82°C at a proof of 90°GL represents about 20% of the total distillate volume. It consists mainly of higher alcohols with esters, aldehydes and acids.

Fifth fraction, distilled at around 88°C at a proof of about 28°GL represents about 10% of the total distillate volume. It consists mainly of some of the highest boiling point esters and aldehydes, which are more soluble in ethanol than in water.

A Master Blender's nose and palate come into play as different proportions of each fraction are selected or discarded, then combined to produce a particular style of rum.

Aging: Light vs. Heavy Rums

As we've mentioned in earlier lessons, most rum in the industry is matured in oak barrels. Light rums, which tend to have very low levels of congeners, usually require very little aging. Some are acceptable after a few weeks or months in the barrel, while others are legally required to be aged a minimum of 1, 2 or 3 years prior to being bottled. Heavy rums, however, tend to require much more aging to become palatable (refer to Lesson III if you want to review the chemical transformations that take place inside the barrels).

Why are Light Rums called "Light"?

One of the most common misconceptions about light rums is that they have a lower alcohol strength than "heavy" rums. Nothing could be farther from the truth: a person will have the same blood alcohol level after 2 (for example) rum drinks regardless of type of rum consumed, as long as the alcohol strength (shown on the bottle's label) is the same. In other words, a light 80-Proof rum has the same effect on the body (as far as blood alcohol level) as a heavy 80-Proof rum.

If Column Stills are so efficient, why do some modern companies use pot stills?

There are several answers:

A) Pot Stills are cheaper to buy than Column Stills.

B) Some companies do not want to compete with the large, multinational rum producers on their turf. Instead they choose to produce rum, using old, traditional methods which are typically associated with craftsmanship and quality.

C) Some pot still rums have earned the palates of very devoted consumers. They have a reputation to uphold and changing from pot stills to more efficient column stills would disappoint their customers.



Hands-On Exercise

For this exercise you will need:

- 2 (or more) pot still rums
- 2 (or more) column still rums
- 1 snifter for each rum (minimum of 4 snifters)
- 4 small labels, or anything else that can be used to identify the snifters
- If possible, the help of a friend

This exercise works best on a wide table. Pour about 1 oz of rum into each one of the snifters. Write “Column” on two of the labels and “Pot” on the other two. Attach the labels to the corresponding snifters.

If you are fortunate enough to have a friend, family member or anyone else around you to assist, instruct that person to change the order in which the rums are organized in front of you, after you have closed your eyes. Don’t worry if no one else is around to help you with this exercise: you can switch them around yourself with your eyes closed, you just need to be careful so you don’t spill the contents of the snifters or, even worse, knock them down with your hands. Whether you do this yourself or someone else does it for you, at the end you want to have a row of snifters in front of you, leading away from you towards the other side of the table.

With your eyes still closed, reach for the first snifter, the one closest to you, and smell the contents. Take as much time as you need to. Once you finish, place the snifter on the table, to your left if it is a pot still or to your right if it is a column still. Repeat this process with each of the three remaining snifters. Once you finish, open your eyes and examine the labels on the snifters.

How many did you get right? If you did not do very well, don’t worry. You can always do it again at a later time.

For some people, the olfactory sense is better early in the morning, for others it is better around noon or mid afternoon. Try it at different times, before meals (to avoid interference caused by food smells) until you find out what works better for you.



From the Rum Bar: Featured Cocktail

Hurricane #1

1 oz. Light or Gold Rum
1 oz. Dark Rum
1 oz. Passion Fruit Juice or Syrup
2 tsp. Lime Juice

Shake with cracked ice, strain into chilled cocktail or hurricane glass.

Hurricane #2

2 oz. White Rum
2 oz. Dark Rum
2 oz. Sprite
4 oz. Passion Fruit Juice (or nectar)
Grenadine (or cherry juice)
151-Proof Rum

Combine white rum, dark rum, Sprite, and passion fruit juice in a mixing glass over cracked ice. Add grenadine until the mixture turns dark red. Shake and strain into hurricane glass over ice. Top off with 151-proof rum. Yields: 1 to 2 servings.

Hurricane #3

3/4 oz. Citrus Rum
1 oz. Light Rum
1/4 oz. 151 Over-Proof Rum
Pineapple Juice
Orange Juice
1 Tbsp. Grenadine
Sweet & Sour Mix

Fill tall glass with ice. Pour all alcohol ingredients into glass and pour equal parts of pineapple juice, orange juice and Sweet & Sour. Pour tablespoon of grenadine. Shake and strain into cocktail or hurricane glass and top off with 151-proof rum. Serve immediately.



Lesson 5 Questionnaire

Q: Who is attributed with inventing the double boiler?

Q: Which type of still (pot vs. column) allows for the fastest distillation of alcohol?

Q: Which type of still (pot vs. column) gives the distiller greater control over the characteristics of the final product?

Q: Which type of still (pot vs. column) is less expensive to acquire?

Q: Can pot stills and column stills be combined?

Q: In terms of alcohol strength, are “Light” rums weaker than “Heavy” rums?

Q: In Lesson 2 we listed the top four rum brands in the USA. How many of these companies use pot stills and how many use column stills to produce their rums?

Answers to Lesson 4 Questionnaire

Q: What determines if a sugar mill produces Grade A, B or C molasses?

A: When producing sugar from sugarcane juice, the cane is crushed in a mill. The crushing causes the juice to be extracted from the cane. Once collected, the juice is heated, clarified (through filtration and the addition of lime) and then evaporated to concentrate the sugar and cause it to crystallize. The remaining syrup is then centrifuged to separate the crystals from the syrup. Once the crystals have been removed, the remaining residue is referred to in the industry as “Grade A Molasses.” This syrup is then evaporated once again to collect even more sugar crystals. The subsequent remaining syrup is then referred to as “Grade B Molasses.” This process is sometimes repeated one more time to extract even more sugar, yielding a “Grade C Molasses” as residue.



Q: What grade of molasses is better for the production of Rum?

A: The best molasses for making rum is the one that has the highest level of fermentable sugars, in this case the highest is the Grade A molasses.

Q: What grade is Blackstrap molasses?

A: Grade C molasses which is the residue found in sugar mills.

Q: What is added during fermentation as a nutritional supplement for the yeast?

A: There is usually a sufficient amount of phosphorus in sugarcane juice and in molasses, but not nitrogen, which is very often added before the fermentation process as a nutritional supplement for the yeast.

Q: What type of gas is released during fermentation?

A: Carbon Dioxide.

Q: What are the basic parts of a pot still and what are their functions?

A: The Kettle- where the liquid mixture is boiled. The Condenser- which cools down the vapors coming from the kettle. The Gooseneck- which connects the kettle to the condenser.

Q: What are "Heads" and "Tails"?

A: Heads- also referred to as "high wines", they are the first alcohols to come out of the still and contain large amounts of aldehydes and esters. The heads are responsible for the fruity aroma found in the distillate.

Tails- also referred to as "low wines", is the result of the still extracting mainly ethyl alcohol from the fermented liquid and there is very little alcohol left in the pot still. The tails contain fusel oils which are the heaviest alcohols produced during fermentation.

Q: List three different ways in which a white rum could be transformed into a dark rum.

A: By adding caramel, through tannins acquired during aging, and by aging (storing) in charred oak casks.



