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## **Operation of The Reflux Column**

### **Safety**

Both the distillation and storage of alcohol has some potentially fatal dangers associated with it. Tall neutral columns in particular can produce very high strength alcohol (ethanol), at an abv of greater than 95%. However, while there are some very real dangers, following some basic safety rules will reduce any risk down to an acceptable level:

Check your equipment carefully before each run, and make sure the coolant system is fully connected up and tested before even switching the still on.

NEVER leave a running still unattended. That is just asking for serious trouble. Get to know the behavior of the still well, and directly monitor it at all times during the run. Make sure you will not be disturbed during the run by anybody or anything. Do not run a still while you are tired or sick or upset, and do not drink alcohol while operating a still. Keep your mind firmly on the job.

Alcohol vapours (and liquid alcohol above about 50% abv) are extremely flammable, and the vapours also highly explosive in the right air-vapour mix. In these ways it is similar to the dangers from petrol.

Alcohol vapours are almost invisible, and the flame from burning liquid alcohol is almost invisible in med-strong light.

Wipe up any liquid spills immediately. Keep a bunch of old dry rags or a bucket of fine dry sand handy to do this. Remove them from the stilling area (to out of doors) as soon as they have been used to soak up alcohol.

Do not allow vapours or liquid product to be anywhere near a heat source, especially a naked flame.

Do not tolerate any leaks from the still. Use a mirror to detect leaks, look for condensation on the mirror. If any are found, **DO NOT** continue the run. Shut down the boiler straight away and repair the leak before continuing.

Make sure the stilling area is well ventilated, so even if you have missed a small leak then vapours cannot build up in the stilling area.

Keep at least one fire extinguisher handy during distillation runs, and also in the storage area, (though not right next to the still or stored alcohol). A fire blanket and a charged garden hose in the nearby vicinity are also a good idea. Always make sure you always have an easy escape route from the stilling area.

High strength neutral alcohol is also a concentrated poison that is colourless, and almost flavourless and odourless. If ingested in any quantity, it could kill. Children are especially at risk. Do not store your alcohol at high abv. Water it down to at least 50% or under. The best storage strength for beverage alcoholic spirits is probably 40% as it is a very common standard that most people are accustomed too, so will not take them by surprise after a couple of drinks.

Also, clearly label your product storage containers with the type of alcohol in there, and the strength (in % abv). Many distillers also write the date of production or bottling on the label.

High proof distillate should be never touch plastic (with the exception of PTFE/Teflon gaskets). It can eat into the plastic and leach unwelcome chemicals

into your distillate. The safest known and best tested materials for contact with your handcrafted alcohol are glass, copper, stainless, and certain oak woods (French and American oak). Oak barrels made specifically for storing alcohol are very good storage containers, and are in fact used for ageing and maturing some spirits, to add colour and flavour.

**Overtemp alarm.**

When buying a thermometer for your still, it is best to get an electronic one with a programmable over temperature alarm. For neutral runs, set the alarm at 80 °C (176 °F), maybe a little higher. For stripping or pot still runs, set the temp at 98 °C (208 °F).

## **Charging your boiler**

The boiler is 50 litres capacity. The element is a low density Incoloy 800, 2400-watt electric element. It will draw 10 amps from your 240v circuit.

Safely charging your boiler means that you must ensure that the element is never run dry. Therefore always add water until it covers the element first (usually about 8 or 9 litres), shine a torch in the boiler and look to make sure the element is covered.

Another good rule of thumb is to keep your boiler charge below 40% abv. This should be about what a charge of low wines from a clean sugar wash will naturally be anyway, but the best thing is to check the charge with your alcometer, if above 40% dilute with water.

More information about diluting the charge is here;

[http://distillers.tastylime.net/library/Listings2.htm#Articles Listings](http://distillers.tastylime.net/library/Listings2.htm#Articles%20Listings)

Just click on the title 'Diluting The Charge'

Charge your boiler with no more than 40 litres all up. This is to avoid overflowing (puking) up the column.

Once you have your charge you can do some basic calculations to predict your yield roughly.

Say you have a charge of 30 litres. You've measured the abv and it's come out at 35%. So the maximum alcohol is 30 litres times 35% is around 10.5 litres of alcohol assuming you could get 100% alcohol. You can only get 95% and there will be some efficiency losses and some trapped in the column etc, so thinking around 8 or 9 litres you should be looking out for changes.

Make sure the boiler and column are fitted with PTFE/Teflon plumbing thread tape or a mix of flour and water to seal. Have the gate valve in the closed position. Run the coolant water into the product condenser (the long one) at the bottom where the alcohol will drip out. From there your water will flow up against the path of the hot vapour coming in, cooling it on the way, and picking up a little bit of heat from it. The water exits the product condenser and is connected to the coiled part of the reflux condenser. From there it is fed down through the coils and back up the centre cold finger tube and out of the system. At this point the water should be fairly hot, so low grade clear plastic tube is not suitable for the plumbing as it can collapse and block the flow of water.

If you are using a pump recirculating system, you should start the water running at the same time as you switch the boiler on. If using mains water you could delay this for ½ an hour or so, but you need to watch for climbing temperature, as alcohol vapours will reach the top of the column very fast once the boil has commenced.

If using a non-recirculating coolant system, set the coolant flow rate so that the temperature of the

coolant coming out during a run is about 45-50 °C (110-122 °F).

## **Obtaining The Equilibrium**

Once your charge starts to boil things will happen very quickly.

Vapour will be moving up your column and heating the copper mesh packing, as it heats the vapour will move further and further up the column. By the time the thermometer at the top of your column (at the take-off port) starts to show any increase you have only a few seconds until the vapour reaches a concentration great enough to spill out of the column if your cooling water is not flowing. This creates dangerous fumes and loss of product.

When the thermometer climbs very rapidly, check once again that your product valve is closed, the coolant is running, and monitor the open top of your column with a small mirror to confirm there is no loss of vapour. If vapour is escaping, switch off the boiler until you have found and fixed the problem.

Once everything is stable and your thermometer has

settled down to a steady reading, allow your column to equilibrate for a minimum of ½ an hour, but preferably for a full hour. This allows the different types or 'fractions' of alcohols to separate out and stack up in the column, with the highest, lightest volatiles settling at the top, and the lower alcohols layering underneath back down the column.

The temperature itself does not matter, within a certain range, only that it settles down and stays fairly constant.

## **Bleeding Foreshots**

Foreshots are the very early alcohols containing the lightest volatiles. Foreshots smell a bit like cleaning fluid or paint stripper. After a few runs you will become familiar with the smell of foreshots (and the other cuts).

Foreshots should be discarded every time. Do not drink them or allow others to drink them. Do not recycle for your next run. Use for lighting your fireplace, or killing ants or weeds, or watered down (at least 3 parts water to 1 part foreshots) and tipped out. On a 40 litre charge 100ml of foreshots should

be discarded at a minimum.

Start by cracking open your gate valve a turn or two after it comes past the stop. It will take a few seconds, maybe a minute, for the vapour to enter the product condenser, and make it's way down to your collection jar, so be patient. Once liquid product starts coming out of the condenser then adjust the valve until you are collecting between one and two drops per second, maintain this setting until you have collected your 100 ml's.

The very first time you run your still, especially if it is the first time you have ever run a still, initially crack the valve open maybe 3-4 turns so you quickly get some product running out the condenser. This is just to check that the system is fully working. Then close the valve off and let the column re-equilibrate until the temperature stabilizes again for a few minutes. Then start removing foreshots as normal (as described in the previous paragraph.)

## **Extracting Heads**

The next portion of your run is termed the heads. These are also higher volatility alcohols and are generally blamed for hangovers. They also have a solvent smell and a sweet taste. A bit like cleaning fluid or paint stripper.

Use a different collection container for the heads, continue to collect at a slightly greater rate. Open the valve enough to increase the collection rate to 3 or 4 drops per second, less than a stream but a rapid drip. Collect the heads until you can no longer taste or smell the solvent smell or the sweet taste. The amount will vary each time with factors like the makeup of the wash, etc. It will generally be between one and three litres. A good way for new stillers to collect heads is in 250-300 ml lots in separate jars, it is much easier to make your cuts after the run, a day or two later. Making good cuts will come with experience on your equipment, but you should be able to get a reasonable product on your first or second run.

## **Running The Hearts**

This is the good bit, the stuff you are after.

Once you are sure you are into the main body of the run and heads have disappeared, you may open the valve to a higher setting. Depending on the purity of the desired result, you can open it wide open, or if you require very high purity at the price of slower collection rates then choose a setting in between. About 6-10 drops usually gives maximum purity from a 2" column, but only your tastes and preferences can determine this, many distillers are happy with the product from faster take-off rates. Smelling or tasting occasional finger dips from the output will tell you how the spirit changes throughout the run.

You can collect now in larger containers, two litre flagons are extremely good for this. Narrow neck containers are best as if the contents catch fire they will not be able to get enough oxygen through the narrow neck and will quickly go out. You should be expecting between sixty and eighty percent of the total alcohol to be contained in the hearts of the run. You can collect in large containers until you see a change in your thermometer settings. A flick of 0.1°C of a degree backwards and forwards throughout the

run is not a big deal, but when the thermometer rises that 1/10<sup>th</sup> and then rises another 10<sup>th</sup>, it's a sure sign that tails are starting.

Big changes in the weather can produce temperature changes greater than a couple of tenths of a degree in a short time, due to changing air pressure, so allow for that. But the changes will not be huge, rarely more than 2-3 tenths.

At this point (or just before when you're more experienced and your taste buds are tuned) you must switch out to smaller jars for tails collection.

## **Extracting Tails**

Once you have a smaller jar back under the output, you should reduce the valve setting back to around the heads extraction setting, i.e. about 3-4 drops a second.

This should bring your thermometer setting back to the original range and if your spirit hydrometer had started to show loss of purity, it should also raise this back up. The amount you can extract in tails of good spirit will vary from run to run, so always collect in

small samples (250ml-300ml) and air out and dilute to taste for inclusion at a later time.

The idea is not to contaminate too much distillate if you get some nasty tastes in there.

After 1-2 adjustments of the valve, once your temperature has consistently risen two 10<sup>ths</sup> of a degree again it's time to stop collecting the tails for consumption, just run out into a large jar for recycling the tails at a later time. Open the valve all the way. Don't discard them as they still contain alcohol, but the collection rate will slow and the abv will drop very quickly till it becomes unviable to collect.

Save these 'feints' with your heads and any samples you discard from your collected jars for a single run through of all feints once you have collected enough to charge your still. Remember to store them responsibly by watering down to a safe level.

## **Operation of the stripping/pot column.**

### **Charging the Boiler.**

Charging the boiler is only slightly different for a stripping run than a spirit run. You should have drained your ferment through a strainer if using a grain wash. If a simple sugar wash, some will charge the boiler (or drain the fermenter) through a piece of cloth to filter any spent yeast or other solids that could burn on the element. Burning is unlikely unless you have unfermented sugars or very thick wash (like grape skins or grain) on your element as it is low density and designed with this in mind. Settling your wash for a few days will allow a lot of the solids to drop to the bottom as well.

Charge your boiler with no more than 40l of wash. If using molasses or some other wash that foams up a lot when boiled, you can reduce this volume by 5 or 10 litres.

Fit the stripping/pot head and put a wrap or to of Teflon tape around the Liebig union before tightening the union.

About 20-30 mins after switching the unit on start your cooling water flowing. The wash will take

around  $\frac{3}{4}$  to 1-1/2 hours to come to temp depending on it's volume and composition.

### **Taking Foreshots.**

As before, you need to remove some of the higher volatiles from your distillate, about 100 ml per 25 litres of wash is ok.

Be sure to put this in a separate labeled container for fire starter, or ant or weed killer, or dilute and discard.

### **Stripping Wash.**

After foreshots you can collect in as large a jug as you like. It's good to use a parrot beak (or eprouvette) system to do this as you can keep a continuous eye on the abv (alcohol by volume%) of your distillate.

If a parrot is not available you can just take regular samples of the output and measure them separately.

The starting % will depend on the alcohol content of

your wash. A high content wash such as a turbo sugar combination may start out around 80% abv, while a low % wash designed for better flavour at the expense of less bulk alcohol may start as low as 55%. The abv will drop slowly as the distillate is taken from the boiler. Once it reaches an output that you consider to be a point of diminishing return (many use 20% abv,), you can consider the run to be finished. This stripping (or 'first run') product is also called the 'low wines'.

### **Low wines and storage.**

If your low wines are destined for converting to neutral through your column, then at this stage they should be treated with either sodium bicarbonate (Bicarb of soda), or sodium carbonate. Use 1 teaspoon of bicarb, or 1 teaspoon of carb, per litre of low wines to reduce and compress the heads component when making neutral. This technique is only for making neutral spirit (i.e. vodka). If using bicarb, leave it to sit in the low wines for a few days before running it. If using carb you can run it straight away.

Do not do this with flavoured spirits like rum or

bourbon that are destined for another spirit run through the stripping head, and do not add either to an unstripped wash of any kind.

Low wines will store indefinitely without spoilage in a sealed container.

## **Cleaning**

### **Cleaning New parts;**

New parts are best cleaned of flux and soldering residues by soaking in a weak acid solution. Spent hot wash from a stripping run (for modified parts), or cheap white vinegar work well overnight, be sure to rinse off with water.

### **Day to Day Cleaning;**

Normal cleaning of your equipment after a run could well consist of only a very thorough rinsing with hot and cold water. Be sure not to wet any electrical components and rinse the inside of the column well, before allowing to fully dry before storing.

Keep an eye on the packing and if worried remove

the bottom few rolls and soak in vinegar for a short time to clean and rinse well before repacking. The packing should not really need much in the way of cleaning if only running low wines in the column.

## **Fermenting.**

### **Specific gravities.**

You use a beer hydrometer rather than a spirit hydrometer for all your fermenting needs. A spirit hydrometer (with abv on the scale) will not work in a wash. It is specifically designed for a pure ethanol/water mix.

To calculate the potential abv of your wash you take a OG (original gravity) reading of a sample of your wash after you have added all the components (except the yeast) that have been cooled to 20 degrees C.

The difference between the OG reading and the FG (final gravity) reading is then divided by 7.36.

An example would be;

$$1080 \text{ OG} - 990 \text{ FG} = 90$$

90 divided by 7.36 = 12.2% potential alcohol.

A good goal for your washes would be between 10-14%

### **Settling the wash.**

Some distillers like to make sure the wash has settled for a few days after it has finished fermenting.

This has the benefits of letting any residual yeast and other solids settle to the bottom so the clear wash can be removed by siphon or a tap near the bottom of the fermenter, and 'racked ' into another fermenter for final clearing. Some distillers believe leaving the yeast in the wash alters the flavour of the finished spirits. This is another one for you to decide on for your personal tastes, it doesn't have to be done and some don't.

Clearing also helps prevent any solids burning on the element. It is important to prevent this if you do not have access to inside your still to clean the element. (The element can usually be unwired and removed

via its mounting socket on the outside, but this is a pain, and requires some knowledge of electrical wiring safety.)

## Reliable Recipes

### Wineos Plain Ol Sugar Wash.

<http://www.homedistiller.org/forum/viewtopic.php?f=14&t=6782&start=0>

I have been working on a simple recipe for a neutral sugar wash without a bunch of extra stuff in it to cause flavors, and this is it. It's real simple.

This is for a 6-gallon (23 litre) wash.

8 pounds (3.6kg) of sugar {dissolved in hot water}

1 tsp of citric acid

1 tsp of DAP

1 tsp of gypsum {you can get this from a beer-making supplier}

A pinch of Epsom salts {Less than 1/8 of a tsp}

1/4 cup of distillers yeast, or 1/2 cup of bakers yeast {sprinkled on top}

Dissolve your sugar in hot water and mix until its dissolved real good.

Add the DAP, gypsum, acid and Epsom salts, and stir until its all dissolved.

Add this to your fermenter, and add enough cool water to make 6 gallons.

The starting SG should be 1070-1080SG. Dont go over 1080SG for best results.

Check the temp, and once its 95f or under, sprinkle the yeast on top.

After 15-20 minutes, give it a good stir to mix things up, and get some air mixed in. You can cover the fermenter with a cloth, or use an airlock.

Depending on the fermenting temp, this will work off in a week or two.

Don't rush it. Let it finish to dryness, and give it another week to clear before running it.

I pot still this wash. It is very neutral, and very clean. It will make a clean neutral, potstilled or refluxed.

By using a large amount of yeast, you don't have to add a bunch of extra nutrients and additives to get it to work, and the less stuff you add, the less it will influence flavors.

All you novice distillers using turbo yeast out there, Try this, and you will be done with turbos, carbon filtering, Etc.

## **Uncle Jessie's Simple Sour Mash.** (bourbon)

(written by Uncle Jessie.. [HYPERLINK](#)

"[http://www.homedistiller.org/wiki/index.php/Uncle\\_Jesse's\\_Simple\\_Sour\\_Mash\\_Method](http://www.homedistiller.org/wiki/index.php/Uncle_Jesse's_Simple_Sour_Mash_Method)"

[http://www.homedistiller.org/wiki/index.php/Uncle\\_Jesse's\\_Simple\\_Sour\\_Mash\\_Method](http://www.homedistiller.org/wiki/index.php/Uncle_Jesse's_Simple_Sour_Mash_Method) )

This method was originally taken from J.W. Walstad's book Simple Sour Mash to Simple Alcohol Fuel! and has been modified according to my experiences.

This method is the most inexpensive I have found for producing Corn Whiskey. It is perfect for beginners because it does not rely on skill for mashing and does not require any cooking which greatly reduces the hassles and expenses.

I used this method for years until I mastered the processes involved in creating a quality sour mash whiskey, at which point I moved on to cooked mashes and more advanced efforts.

### Ingredients

For a 5 gallon mash: (20l)

5 gallons soft, filtered water.

7 lbs (3.2kg) cracked corn. 6-8 pieces/kernel is the proper crack. If using bird feed, make sure it is perishable, or in other words is free of preservatives.

7 lbs (3.2kg) of granulated sugar.

1 tbsp yeast (distillers yeast if available.)

## Theory

Unlike a cooked mash, a simple mash does not rely on grains for starch. The corn is included for a bit of alcohol, but mainly for flavor while the sugar provides the alcohol. The conversion of starches to sugars is a natural process, accelerated by cooking. An uncooked mash will convert starches to sugars but much more slowly and less efficiently. Your added sugar will ferment rather easily and will provide most of the alcohol in your beer.

Your first distillation run will be a "sweet" run since you will not have any backset to use for sour mashing. I recommend using the spirits you collect in your first run as feints for the next run. Yes, all of them. Your second run will produce your first batch of sour mash, which will be good, but in truth the flavour and consistency will not start to reach their peak until the third or fourth run in my experience.

Practice, practice, practice!

## First Fermentation

Put your ingredients into the fermenter in the order listed and close it. You should start to see fermentation of the sugar within 12 hours. It should take 3 or 4 days for the ebullition to end. Siphon your beer out of the fermenter with a racking cane and charge your still.

Siphoning is the best method because it allows you to pull the beer off the top of your lees, leaving them undisturbed. You do not want suspended solids in your still and this method works quite well in keeping the lees at the bottom of your fermenter.

At this point you need to make your first decision. How much backset will you use in your subsequent mashes? The legal minimum for a sour mash is 25%. I do not like to go above 50% in my experience. For the sake of simplicity, let's say you will start with 25% backset. This means that for a 5 gallon mash you will use 1-1/4 gallons of backset and 3-3/4 gallons of water.

Since you will be running your still for hours, you do not want to leave the fermenter empty. Put your 3-3/4 gallons of water back into the fermenter so your yeast won't die while you distill. While you're at it,

this is a perfect time to scoop the spent corn off the top and replace with an equal volume of newly cracked corn. Later we'll add the 1-1/4 gallons of backset and 7 more pounds of granulated sugar.

## Basics of Pot Distillation

There are two basic types of pot distillation: The first involves a traditional pot still, which has no cooling in the neck or column. The distillate produced is lower in proof than that produced by a reflux still with a fractionating or splitting column. This is the traditional method of distillation and requires multiple runs. The distiller will save up enough low wines from the first runs or stripping runs to fill the still for a second run. If a triple distillation is desired, the product from second distillations are collected until enough spirit is saved to fill the still for the third spirit run, and so on. The second type of pot distillation is performed in a reflux still equipped such that the column can be cooled during distillation. This type of still is far more efficient and can produce a high proof, high quality spirit in a single run.

### First Run

Pot distill your wash, being careful to keep things running slowly. For beginners, 2-3 drops of distillate exiting the worm every second is just about the

perfect speed. As you collect, periodically put 4-5 drops of distillate into a spoon with an equal amount of water and sip it. You will learn to identify the off-taste of the heads very quickly.

For your first run it is best to take very conservative cuts. I recommend very generic whiskey cuts, say 80% down to 70%. As your skills improve you will be able to go deeper into your cuts, tasting periodically for the off-taste of the tails. Once you learn to identify the off-tastes of the heads and tails you will be able to make proper cuts without the use of a hydrometer, a big step toward becoming a competent distiller.

By law any spirits collected above 80% cannot be called whiskey because they are considered too "light" or neutral. In other words, they are too high in proof and thus do not properly imbue the spirit with the flavour of the grain mash. I use anything collected above 80% as feints for the next run. For more information on the legal definitions for whiskies and other spirits check out Title 27 of the U.S. Code of Federal Regulations.

Remember to discard the first 150ml or 5 fluid ounces collected so you don't get any methanol build up over time and batches.

## Second Fermentation

Your fermenter should now contain 3-3/4 gallons of water, your old yeast (barm) and your old corn.

Take 1-1/4 gallons of backset from your previous distillation and add to it another 7 pounds of granulated sugar. This will dissolve the sugar rather easily. Hot backset directly from the still works better at dissolving sugar, but adding hot backset to your fermenter will kill your yeast, so allow the backset to cool if you use this method.

Next, add this mixture of sugar and cooled backset to your fermenter, which already contains 3-3/4 gallons of water. This will bring your total beer volume back to 5 gallons.

Now is the time to make sure you have removed and replaced any spent corn kernels, which float to the top of the fermenter. You only need to do this if you plan on a continual ferment, that is, past 7 or 8 fermentations at which point your corn would otherwise be expended.

Cover the fermenter and let it ferment for another 3-4 days or until the ebullition ends.

Congratulations, if you have done everything properly you are now ready to run your first sour mash!

## Second Run

Siphon off your beer and charge your still. Again, replace 3-3/4 gallons of water into your fermenter so your yeast doesn't die while you distill.

Distill your whiskey in the same manner you did during your first run, being conservative with your cuts until you gain more skill. Anything collected under 80% ABV on this run is considered a Sour Mash whiskey. Congratulations! This spirit is a palatable moonshine when collected directly out of the still.

Collect your run down to your stopping point. Again, I recommend 70% ABV for beginners, perhaps a few degrees into the 60's if you are bold. Save all of the spirit run as good sippin' whiskey.

Most moonshiners keep running their stills long after they are finished with the spirit run, collecting down to about 20% ABV before stopping. Together, the heads and tails are reused as feints. I do not normally go as low as 20%, you'll have to find your comfort zone. If you start to get blue or green flecks in your

spirit, you've gone too far or run things too hot.  
Repeat the Process

After your run, collect 1-1/4 gallons of backset to return to the fermenter for your next batch. Repeat the process starting at the Second Fermentation.

You are now producing a simple sour mash whiskey and with practice you will be able to produce a very high quality moonshine. Age this whiskey in an uncharred oak barrel to produce a traditional Tennessee-style whiskey.

Safety first, Duke boys. Have fun!

**So, for 40l wash. Recipe goes like this.**

7kg cracked feed corn,  
7kg raw or white sugar (I like raw)  
Dissolve sugar in hot water, then add enough cold water to make 40 l total.

Strip in potstill discarding 100ml of foreshots down to 20%. Save the strip. While the drum is empty, scrape off 1/3<sup>rd</sup> of a bucket of corn and add 1/3<sup>rd</sup> of a

bucket of new corn.

Add some water (20l or so) to the yeast bed so you don't burn the yeast next step.

Use 10l of hot slops (backset from the still run) to dissolve 7 more kg of sugar, stir it up and add to the drum. Add water to bring it up to the level it was before.

Watch it ferment and strip again and again.

When you have 40l of strip saved up, do a slow spirit run in the potstill making careful cuts. Age it on toasted oak sticks.

## **Death Wish Wheat Germ Wash.** (light whiskey)

From the same website as above.. (homedistiller.org)

This is a very easy wash I use 10lbs of sugar 16oz of wheat germ 1 tsp of citric acid I put all of that in a 5 gallon pot fill it close to the top with water and let it boil for about 1 and 1/2 hours then pour it in my 6 and 1/2 gallon fermenter top it off to 6 gallons total with water let it cool then add my yeast. I like to use red star champagne yeast it is only 79 cents around here. it should ferment in about 3-4 days be careful I have had this recipe blow the bubbler out and put a dent in my ceiling. lol I like mine strong. with my pot still I always throw away about a cup of the heads then I stop it at about 100 proof that is what I call the drinkable stuff. The tails I will take down to about 20 proof and rerun it later with a bunch of other tails with my re fractioning still I run it fast to about 20 proof get about 12 gallons and run it slow at 170 degrees at the top of my stack. I stop pulling it as soon as it starts to drop the rest is tails to me. I feel that this has a very clean smooth scotch flavour this is the most drinkable recipe I have.

This translates to a 22 litre wash containing 4.5 kg of sugar boiled for 90 minutes with 1/2 a kilo of Wheat germ from the supermarket and five or six litres of water and the juice of 1 lemon or 1 tsp of citric acid (baking section of the supermarket) .

Be careful and watch as it comes to the boil as it foams up everywhere, also leave a lot of headroom in your fermenter as it foams during ferment as well. Distillers yeast is good for this, I think it may be too rich for bakers yeast.

If you strip a three or four batches of this brew then do a spirit run in your potstill and age on toasted sticks you will have a fine whiskey that will appeal to the Scotch or Irish Whiskey drinkers.

It also makes a good sugar wash with plenty of nutrients for refluxing in the column.

## Rum.

A good rum recipe for 40l is fairly straightforward.

Take 8l of feed molasses and 1.5kg of raw sugar, mix with enough boiling water to dissolve it all, and pour into fermenter. Top off to 38l mark with cold water and pitch  $\frac{1}{4}$  cup of Bakers yeast.

If preferred you can add a yeast nutrient bomb by adding 5 tsp DAP, 2 crushed multi vitamins and  $\frac{1}{2}$  cup to your boiling water and boiling for ten minutes to kill the yeast. This should make your ferment faster.

The final gravity when using feed molasses does not reach as low as when doing plain sugar washes because of the amount of unfermentable solids contained in the wash. Depending on the molasses it may be as high as 1030 or 1040 when finished. The best way to judge is a complete lack of activity, a constant reading over a few days, a lack of bubbling, and a lack of sweetness when tasting the wash.

Strip the wash down to 20% abv exiting your stripping head, when it's done and collect the strips for a slow spirit run using the potstill head.

When charging your fermenter up for all subsequent

runs, use about  $\frac{1}{4}$  of the hot slops or backset (in the case of rum, called Dunder) from your boiler to add back flavour and sourness. This hot dunder can be used for dissolving your sugar and molasses, and sanitizing the new ferment mix and the fermenting barrel. Let the temp of the freshly mixed ferment fall below about 30 C before adding the yeast. Loosely cover the top of the fermenter while it is cooling.