Vinification Methode Traditionelle: Vinification by Encapsulated Yeast: Champenoise Style

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The production of Champenoise style wine requires some experience in yeast fermentation, malolactic fermentation, clarification, and accurate measuring. While the making of sparkling wine is not more difficult than still wine production it does require care to details and has an element of danger. The results are (usually) one of the truly great reasons for home winemaking. There is a vast difference between the Champenoise style and the Sparkling style of wines. I do enjoy a refreshing sparkling wine. They are usually full of nice clean fruit with good acidity. They may be made with relative ease using CO2, a diffuser, and a pressurized stainless steel container. There are many recipes available for the pure bubbly. The Champenoise style sparkly has a combination of three critical elements:

- Flavors derived from yeast autolysis
- Carbonation, best when small, fine bubbles
- Flavors and structure of the grapes/juice

The critical, differentiating attribute of Champenoise are the flavors contributed by the yeast exposure. This quality needs time to express itself in the wine.

The following procedures and ingredients are adaptations of France's Champagne region's *Methode Traditionelle.* This is a classic method of making sparkling wine attributed to Don Perignon. The French procedure takes marginally mature grapes, from one of the world's cooler viticultural regions, and transforms them into one of the most desirable beverages in the world.

The desirability, the sexiness, the subtle hedonistic pleasure of Champagne style wine is enhanced with the yeast/wine exposure. While length of yeast exposure enhances the wine, once separated from each other the wine may be enjoyed straight away. Time and labor are both expensive for the commercial producer, but the staple of the home producer. *Late disgorged* commercial champagne is probably as close to this fully developed yeast quality as the non-winemaker can get.

There is a real pecuniary incentive to making your own version of Champagnoise, especially if you enjoy the premium wines of France's Champagne region. The home producer can easily provide the two costly ingredients of champenoise production: labor and time to age the wine in bottle.

The **MOST** important ingredient of sparking wine, and the least forgiving, are the grapes (juice). The swirl of bubbles, as it ascends in the wine glass, vaporizes the slightest defect and magnifies every feature of the wine. The aroma and bouquet of sparkling wine are CO2

propelled into your nose and mouth. Even the fine qualities much admired in still wine would be overbearing and offensive in this bubble-propelled world. It is absolutely critical that the wine be clean and free of any strong character -- good or bad. A clean, crisp, austere character is the most desirable. This is no dumping ground for wines that do not make the still wine grade. Muscat flavored sparkling wines are the exception to this rule. They are not considered in this recipe edition.

CLEAN JUICE, CLEAN WINE - A MUST!

Chardonnay, Pinot Noir, and Pinot Munier are the principle grape varieties used in the production of Champagne. These varieties are harvested at 17.5% to 19.5% sugar. The sugar should be below 20% to allow for the secondary fermentation in the bottle, and to not impart an excessive alcoholic character. The lower sugar is better, but the flavor of the grapes must be developed. The total acidity should not be too high and the pH not too low. The total acid should be between .9% - 1.3%. Below .9% TA the base wine may need some acid addition after malolactic fermentation. Lower acidity means higher pH. Higher pH makes the wine more susceptible to malolactic fermentation. Total acids above 1.25% will demand acid reduction or blending to reduce the acids' eventual bite in the mouth.

GRAPES TO JUICE

Without any SO2 or crushing, the grapes are directly pressed. Whole bunches of grapes, with stems, are lightly pressed to express the juice. Juice yields from a ton of grapes will be 110 to 135 gallons/ton, 30% less than normal. A small addition of SO2 may be made at this time, 10 – 20 ppm usually.

After pressing, the juice is immediately chilled and settled in a stainless steel tank or carboy. Every effort is made to chill the grapes and juice as rapidly as possible. After chilling to 33°F - 35°F and settling for 2 to 4 days, the clarified juice is carefully racked from the gross sediment. Some producers in Champagne wish to have the juice *'as clear as water'*. This degree of clarity is desirable though it can prove difficult if malolactic fermentation is required. The clear juice is racked to fermenting vessels, or in the case of Brehm Vineyards, to drums and buckets for distribution or freezing. In the Champagne district there are many grape grower cooperatives. These coops harvest and process the grapes, as does Brehm Vineyards. Many of the Champagne houses in France receive clarified juice, just like you.

THAWING THE JUICE

The only difference between fresh juice and the frozen is in the thawing. Forty-six gallon drums of juice take 4 to 6 days to thaw, buckets take 2+ days. As the juice melts an iceberg will appear. The iceberg is 94% water. It floats, and as it melts the juice becomes very stratified. The sugar content at the bottom of the drum will be +/- 40° brix, and 7° brix in the top where the iceberg last melted. Cream of tarter created during the freezing process accumulates at the bottom of the drum. This combination

of potassium and tartaric acid crystallizes at lower temperatures and with higher alcohol content.
STIR THE JUICE VIGOROUSLY as the ice melts. Keep juice cool and allow it to settle for two days. The stirring is to redistribute the sugar in a homogeneous way as well as dissolving the cream of tarter. With must for sparkling wine, it is usually wise to begin stirring while there is still ice present. Stir a lot more than you feel necessary. Most containers of juice are well clarified and should be completely used as provided. Even the cream of tarter at the base of the container should be recombined with the juice for fermentation.
See **Acid Adjustment** *section.*

On rare occasions the juice will be quite cloudy. After aggressive stirring, allow the juice to settle for one day, then rack the reasonably clear juice to your fermenting container. Stir the remaining cloudy juice once again and store as cold as possible. After settling, rack again and combine the clarified juice into the fermenter. In this manner you can salvage as much as possible of the juice.

Acid Adjustment
All of the Champenoise juices I have harvested require malolactic fermentation. The juices are too acidic to enjoy without acid reduction or the addition of sugar to mask the acid's bite. Without malolactic fermentation any wine is basically unstable. An unstable wine must be sterile filtered to remove any unwanted malolactic bacteria or yeast from the wine in the bottle. Malolactic fermentation in a Champenoise bottle will ruin the wine.

1. Malolactic Fermentation:
Malolactic fermentation is the reduction of natural malic acid in the wine to a milder lactic acid and carbon dioxide. It is a bacterial fermentation that leaves the wine lower in acid. Low sugar grapes used in the sparkling wine production have a much higher percentage of malic acid in their total acid make up of the grapes than more mature fruit. Malolactic fermentations are highly desirable in the Champagne Region due to their grapes' excessive acid levels. With high acids, M.L. is the most desirable and stable way to reduce a wines' acid content. Once the malolactic reduction has gone to completion it is over and will not happen again. Paper chromatography sets are available to test for the presence of lactic acid and the reduction of malic acid. This test may read no malic acid, and a very small quantity may remain. Have a wine laboratory do an enzymatic test before bottle fermentation, or store the wine in a warm area for a few months before bottling.

If malolactic fermentation is attempted, the acid reduction can often be great. Additional acid may need to be added to balance the wine. This can only be done by taste. The wine should be tart, but not unpleasant to the taste. It would be a little too tart to drink in large quantity.

Malolactic bacteria exist on the grapes, and on the walls and floors of an established winemaking area. They do not go away if ignored. If the wine undergoes a partial, incomplete malic reduction and cannot be induced to finish, it should be considered very unstable. Only a very thorough (sterile membrane) filtration at .45 microns will allow sufficient removal of bacteria to make the risk of future bacterial activity acceptable. The use of high levels of sulfur dioxide to help in this matter is standard in still wine. Sparkling wine can take only very low levels of SO2. High levels of this chemical would not only retard malolactic fermentation but also make bottle fermentation more difficult. If the bottle fermentation succeeds, the high SO2 may make the bubbles of this delicate wine repulsive. It is imperative that a paper chromatography test kit be purchased and used to monitor the malic acid content of the wine before bottling.

If M.L. does take place, do everything possible to bring it to completion. Please note that Pris de Mouse yeast (EC1118) and many other Bayanus (Champagne) strains will scavenge nutrients from the wine/juice to the point it can inhibit or stall malolactic fermentation. Do the malolactic fermentation after a complete sugar fermentation is complete, 0.2 % residual sugar or less.

Malolactic fermentations are much more subtle, quieter than a sugar fermentation. They also require a warm (70°F / 20°C) temperature to perform best. It may be helpful to add some additional nutrients (yeast extract, biotin, patothenic acid, B1) for the bacteria and always have the wine on its light (at least) lees. The malolactic bacteria should be started in a 1.5-liter bottle 1/2 full of the fermenting/ed wine and 1/2 full of frozen apple juice. Keep starter at 80°F / 27°C.

Winemakers who are inexperienced with malolactic fermentations or have juice with extremely high acid content should also consider other methods of acid reduction prior to malolactic fermentation.

2. Chemical Reduction in the Juice:
A double salt (acidex) is added to the juice to precipitate both the malic and tartaric acid. The best procedure involves neutralizing all the acid in a small portion of the juice (5 - 20%), then reuniting this completely de-acidified juice with the total batch.
At this time acidex is difficult to obtain in the USA. Calcium carbonate is the alternate chemical to use.

3. Blending of Wine:
Discussed under
CUVEE/COUPAGE

4. Racking off Cream of Tarter:
Most of the Champagne style juice I have marketed has been shipped and stored as frozen juice. Lowering the temperature of the grape juice or wine decreases the solubility of tartaric acid. The insoluble tartaric acid crystallizes into cream of tarter and falls to the

bottom of the frozen container. You may significantly reduce the acid content of your juice by:
-Vigorously stirring the partially defrosted juice.
-Once completely thawed, allow it to settle well.
-Rack the clear juice off the sediment.

You want to distribute the sugar throughout the container while the temperature is the coldest. Allow time for all the cream of tarter to settle and then rack. Taste the sediment to make sure you are not leaving an excessive amount of sugar on the bottom. The sediment should taste quite acidic, no sweeter than the rest of the juice. Hold and ferment the sediment separately. This technique has proven quite successful in lowering the acidity of juice that has been frozen. It primarily reduces the tartaric acid, allowing for a more probable malolactic fermentation. The acts of racking off the cream of tarter and completing malolactic fermentation will result in a very dramatic lowering of the acid content.

FERMENTATION DES MOUTES

The treatment of the base wine for sparkling wine production is the same as for most quality, white still wines. The yeast recommended for both production of the base wine and bottle fermentation is a wild yeast from France's Champagne region. The Institut Oenologigue de Champagne isolated the strain of Saccharomyces Bayanus. It is unromantically called DV-10. LALLEMAND of Montreal, Canada distributes it in North America. A 1-liter bottle of the defrosted juice per 5 U.S. gallons of wine should be taken for a yeast starter. From the frozen juice take a sample just before all the ice melts, after a vigorous stir. Add approximately 5 grams of DV-10 yeast to warm (100°F / 37°C) water to rehydrate. Do not disturb for 25 minutes, then add to the bottle of juice and attach a fermentation lock. Store in a warm (70°F/22°C) place that can endure overrunning juice. Foam and bubbles will rise in the liquid; this bubbling of the fermentation locks indicates the yeast is ready for addition to the juice.
ATTENTION:
There are strong arguments for doing the malolactic culture propagation concurrent with your yeast starter. The risk of doing the malolactic fermentation concurrent with the yeast fermentation arises if the malolactic fermentation finishes before all the sugar is consumed. In this instance the malolactic bacteria may start metabolizing the sugar producing extremely nasty volatile acid/vinegar. The wine damaged in this way must be thrown away. I would recommend the addition of a very large and active malolactic culture and nutrients at the end of the yeast fermentation. It will be imperative that you have a large, active malolactic culture prepared! The success of the M.L. may require you to conduct its ferment at temperatures substantially warmer (70°F/22°C) than those about to be mentioned.

As with all yeast debates there are differing views. Some winemakers prefer, for the initial juice to wine fermentation Cote de Blanc or R2

yeast instead of the Bayanus strain, DV-10. This could allow the possibility of both yeasts fermenting in the bottle, concurrently.

ADD YEAST STARTER TO THE CLARIFIED JUICE

The fermentation of the base wine should be conducted at, or below, 55°F/13°C. The use of a quality yeast food is highly recommended. The yeast food should have, at a minimum, diammonium phosphate and vitamin B1. The yeast food should be added once the fermentation begins. An additional dosage of yeast nutrient may be given at 12°-10° brix. Once the fermentation begins, the temperature may be reduced to as low as 40°F. Maintain a good steady fermentation without excessive foaming. Once the yeast has reduced the sugar to less than 8° brix, the temperature should be raised gradually to 65°F/17°C. A relatively warm temperature at the end of fermentation should aid in its completion. Final sugar readings are best conducted with an Ames 'dextro check' reducing sugar test kit. Test kits for diabetics may also work. The Ames kit is accurate and easy to use. The wine has finished its sugar fermentation when it contains .2% sugar, or less.

It is important that the base wine does not contain significant residual sugar. Excessive sugar will lead to **excessive pressure** in the subsequent bottle fermentation.

An enzymatic test is necessary to assure that malolactic fermentation is complete. Paper chromatography gives an 'indication' of the malic acid status. It is not sensitive enough to assure that the malic content is reduced enough to not start a refermentation. This usually requires sending a sample to a wine laboratory, or taking a chance.
As the fermentation is completed make sure the fermenters are filled completely to minimize contact with air (surface area of wine minimized).

ADD FINING AGENTS AND CLARIFY

It is the custom in many Champagne houses to leave the wine on its fermentation sediment for 4 to 5 months. This procedure is especially helpful in promoting and finishing a malolactic fermentation. The stirring of the lees is also helpful in adding a sur lees character to the wine. Even when no malolactic is desired, it is recommended that the wine be left on its yeast for 4 weeks after fermentation. It is important to monitor, smell and taste, the wine regularly during its storage on the lees. Immediate racking is required if any off character is detected.

The use of Pinot Noir grapes may cause the wine to have a pink hue. I would not worry about this color and embrace it as a feature of the vintage.

The wine will then be clarified by fining with isinglass and bentonite. Both of these fining

agents demand preparation the day before. Three grams of isinglass are combined with 6 to 8 oz of water, a pinch of tartaric acid and a speck of S02. Stir constantly or agitate with a blender -- you cannot over beat it or use an excessive amount. Leave the isinglass solution overnight, beat again. This amount will be sufficient to clarify 50 gallons of wine. Blend well into wine at time of addition. Bentonite should be added a couple of days after the isinglass. Use at the rate of 1.1 to 1.5 grams per US gallon, .4 grams per liter. A solution of water and bentonite must soak overnight before use.

Other fining agents may be used for specific purposes. Activated carbon will fine out color, and gelatin or egg whites can reduce bitterness. The wine should be protein stable (bentonite), clear, and cold stable. Cold stability is essential. While fining, store your wine in as cold a site as possible. It may be necessary to put the wine in a refrigerator or wait until winter, but you must expose the wine to the coldest temperatures possible, without freezing. This will assure that there will not be cream of tarter crystals rolling around in your bottle of wine and yeast.

As soon as the wine falls bright and is cold stabilized, rack it into new containers and add .66 grams of potassium metabisulfite per five US gallons /19 liters of wine (approx. 1 tsp./37gal. /140 liters). It would be desirable to blanket the receiving and delivering containers with CO2 or N2 to preclude any oxidation. You will transfer a small amount of sediment during the first racking. When the wine falls bright again, in about one month, rack again. If you have the capabilities to filter at .45 micron, this would be the appropriate time to do it. Filtration will lower the possibility of a malolactic fermentation in the bottle and greatly reduce other spoilage problems. If the wine is clear and you know the malolactic fermentation is complete, filtration is not desirable. It will make bottle fermentation a little more difficult – perhaps.

CUVEE/COUPAGE

The success of your sparkling endeavors will be greatly enhanced with the blending of libraries of base wines. It is here that commercial houses, with many different lots, can make up consistently fine wines year after year. Some fine champagne houses limit the amount of vintage champagne to 20% of the harvest. It is difficult to receive one juice/wine that, on its own, will produce a fine sparkling wine – but I have found – not too difficult. Blends of vineyards, varieties of grapes and of years are what it takes to produce consistently high quality commercial lots. It is recommended that a good portion of your base wine (25% to 35%) be held back for blending in future lots. This may help in high or low acid years. It provides you with one of the most effective and least intrusive techniques in producing the style of wine you like.

TIRAGE

BOTTLE FERMENTATION

Here the fermentation in the bottle-Champenoise style - differs from the fermentation of juice. We must have a strong fermenting yeast with very good flocculation properties and the ability to withstand high pressure, high alcohol and acid. Here I strongly recommend Lallemand's DV-10, Bayanus strain.

The first task is to rehydrate the yeast in 95°-104°F / 38°C water for about 20 minutes. The next job is to acclimate it to an alcoholic environment. Only after this acclimatization will it be time to prepare the yeast starter itself. There are as many protocols to acclimatize the yeast as there are Champenoise winemakers.

Many winemakers utilize a Tirage syrup for the addition of sugar:
-during yeast conditioning and propagation
-to the wine for the bottle fermentation
-at disgorgement to sweeten the final wine

Tirage syrup is made by adding sufficient base wine to 500 grams of granulated cane sugar to end up with a total of one liter of syrup. The low pH of the wine will help in converting the cane sugar to a more completely fermentable form.

The following recipe for one liter of yeast starter may vary in sugar content from 26 to 45 grams of sugar. Sixty gallons of Champenoise would only require 46 grams of yeast, other components may be expanded / contracted proportionately.

YEAST STARTER FOR BOTTLE FERMENTATION (1 liter per 5 US gallons):
Day one:
-Rehydrate yeast for 20 minutes in 6-7 oz. of water at 95°- 104°F.
-After 20 minutes:
Add 6-7 oz. (1/4 ltr.) of Champenoise wine
a pinch of yeast food/nutrient
Day two - after signs of fermentation:
-Add up to 19 oz. of Champenoise wine
14 to 30 grams (1/2-1 oz.) of sugar or 24 to 48 ml of Tirage Syrup
a pinch of yeast food/nutrient

Seal with fermentation lock and store at 70°F / 21°C. It may take a surprisingly long time for this starter to begin fermenting (3 to 4 days). The aeration of the starter is recommended. This is a hostile environment for the yeast. If there is a failure in genetic adaptation, let it be out here in the starter bottle and not in your bottled wine. If after 5 days there does not appear to be any fermentation, taste the starter. If it is still sweet, splash the wine and add an additional package of yeast. If it is dry, or noticeably less sweet, fermentation is proceeding. Check your starter, it should be cloudy and giving off CO2 gas.

The amount of pressure produced in the bottle is directly related to the amount of priming sugar added to the cuvee (base wine) and yeast starter. In Champagne there are two levels of carbonation. GRAND MOUSSEUX is fermented to a pressure of six (6) atmospheres

and CREMANT is produced at three (3) atmospheres. These bottles of pressurized wine are bombs. **They are extremely dangerous.**

The procedure for adding the sugar must be precise and accurate. The sugar must be evenly distributed throughout the cuvee. The bottles, caps and capper must be of the best quality. Beer quality is not close to acceptable. Be sure to inspect your sparkling wine bottles very closely. There should be no chips, no cracks, and the upper lips must be fault free. Make sure the bottles are from a product that was *'fermented in this bottle'* -- methode champenoise. The label usually states this, expensive wine is usually O.K., and inexpensive is suspect. Used bottles must be scrupulously clean and then run through a soapless dishwasher cycle. New bottles are expensive but should prove to be more convenient in capping, and more reliable in holding the pressure. European bottles will not accept American crown caps.

I have never been in a commercial cellar where there is not a **lot** of broken glass within view. You will be handling these bottles; at least your hands and eyes are at risk. Buy protective gloves and a face shield, the risk is real.

The largest loss of wine in the process of methode traditionnelle - champenoise is leakage past the seal in the crown cap. A poor capping machine usually cause this. Most crown cappers -- used in home production of beer or pop -- will not completely seal a crown cap. Those that do are either expensive or old. Sparkling wine crown caps are double lacquered -- painted-- to avoid deterioration due to the high acid content of the wine. Aluminum and stainless steel caps have been introduced into California, which have been well proven in France. In the opening, the mouth of the bottle, you can place a small plastic cup so that its bottom is flush to the crown cap above. Its open end is down in the bottleneck. It is added after filling the bottle and before capping. The small cup is called a bidule. It is Champagne's little answer to NASA's projectiles. During the riddling process the sediment is accumulated in this cup.

ASSEMBLE EQUIPMENT AND SUPPLIES FOR BOTTLING:

Per five US gallons of wine:
-25 "Fermented in this Bottle" Domestic sparkling wine bottles
-25 Crown Caps
-25 Bidules (optional)
-A sturdy, heavy-duty bench model crown capper that completely pushes down the skirts of the crown cap.
-6+ feet of 3/8" pvc hose
-A small bottle-filling valve (optional)

BLEND YEAST STARTER AND CUVEE, AND BOTTLE

The container (drum/bucket) your grape juice came in is an ideal blending and bottling tank. Place the drum/bucket at least 18" above your

bottling surface. For each 5 gallons of future sparkling wine add:

- approx. one-half gal. of base wine
- 1/5th gram of dissolved bentonite (prepared the day before)
- - 1/2 pound of white, granulated sugar for cremant style, 3/4 lb. will give higher carbonation
  - 1 liter of active yeast starter
  - stir the solution well
  - stir in remaining 5 gallons of base wine.

IMPORTANT
Make sure sugar is stirred in and completely dissolved.

Begin filling, inserting the bidules, and sealing with crown caps. An alternate strategy to aid in proper mixing is to distribute the exact, proportional amount of sugar, bentonite and starter into the individual bottles before filling. In either case it is critical that the sugar, bentonite and starter are evenly distributed in the bottles!

This level of sugar will result in a wine carbonated as a 'cremant'. This level of carbonation is completely satisfactory as a fine sparkling wine. Much more important in the sparkling presentation are the glasses. Regular wine glasses will quiet and subdue even the finest French Champagnes. Fluted or long stemmed, tulip shape glasses are required for sparkling enjoyment. The hollowed stem, saucer shaped glasses are better than standard wine glasses, and quite enjoyable when serving fruit in the wine.

The lower carbonation level makes the handling of these bottles safer. Wine carbonated at classic champenoise levels would use one pound of sugar in the above recipe. The disgorgement in your cellar with the following *'A la Volee'* method allows the resulting wine to have considerably more bubbles in the glass, than the "Commercial" Methode Champenoise you would obtain from the store. I recommend starting at the lower (cremant) carbonation level, and then gradually raise the amount of sugar with experience.

Legend maintains that there is a mystic bond between the wine and the vines. The liquer de tirage, bottled sugar wine, begins to ferment in the bottle when the sap is beginning to rise in the vine (it's warming). This fermentation will take place in the stacked bottles of wine. This is usually done by laying the bottles down on their sides, neck to punt. Two wooden slats are laid across each row. These slates provide a flat surface for the next layer of bottles. The entreillage (stacking of bottles 'sur lattes') should be done in an area where leaking wine is not a problem. The area should not be subject to wide temperature variations. It should be a cool, mild area. This will be the home for your wine for at least one year. Two to three years is highly recommended. The wine -- not necessarily the seals -- will last in this condition for over 20 years.

It is recommended that long-term storage of the wine be on its side. This allows the maximum

exposure of the yeast to the wine. Storage on point or standing on the base will reduce the flavor transfer from the yeast to the wine.

It should be noted that the addition of the 1/5th gram of bentonite is critical. The bentonite acts as an interface between the yeast and the bottle. There are many other products available to accomplish this task. Without this interface, you will not be able to remove the yeast while it is attached to the bottle. This will result in the loss of the wine.

REMUAGE/RIDDLING

We are now in the exclusive turf of the Methode Traditionnnelle. Your curiosity will have you looking into the stored bottles. Cloudiness and sediment forming on the bottom of the glass indicates that the fermentation is under way.

After fermenting and resting on its side for one to five years (hopefully at least 30 months), you decide to put the wine in a consuming mode. The task is to break up all the encrusted sediment on the inside of the bottle and put it into the bottle's bidule or stack it up on its crown cap. It is recommended that you wear gloves and eye protection while handling these bottles.

The bottle is shaken by holding the neck of the bottle and (keeping your elbow at your side) lifting the bottle upside down to bottle cap up many times. The encrusted yeast must break up without any particles holding on to the glass. The wine should be turbid. The wine is then placed into a riddling rack at a 30° to 45° angle, neck down.

Old wooden milk crates, homemade riddling racks, or other containers that can accept a wine bottle leaning at a 45-degree angle are needed. Riddling racks (pupitres) are sloping racks of two sides, hinged on top that holds the bottles by the necks in 1-1/2" holes. As the yeast sediment is rolled together, the bottle is gradually advanced into a vertical position, neck down.

There are two rotations we are talking about. As indicated above, the rotation of the bottle on the vertical axis from a position of approximately 30°/45° to one completely vertical (neck is always down). The other rotation is best viewed from the base -- punted bottom -- of the bottle. It is the rotation on a horizontal axis. It is common for bottles entering into remuage to have a slash of white paint affixed to the bottom. The top of the round bottle would be the 12:00 o'clock position, the bottom the 6:00 o'clock position. Remove a few bottles from your stack. Shake them vigorously to loosen **all** the sediment. The bottle is placed in your home riddling rack (pupitres) at a 30° to 45° angle with the crown cap down. Leave the bottle with your riddling mark at the 6:00 o'clock position. The yeast will settle over the next week or so. The yeast will settle on the lower 180° of the bottle, leaving the top 180° yeast free.

The remainder of our riddling is designed to keep the top 180° sediment free while rolling

the sediment along the other side of the bottle into the bidule or bottle cap.

The riddling mark is twisted 1/8th of a turn each time you move it. It begins at the 6:00 o'clock position (the hour hand doing the pointing) and is first moved to 7:30 position. The move is a brisk twist. You must check with a flashlight the clarity of the wine in the bottle before each movement.

Every four days, when clear, or convenient the bottle is rotated again. The next position is 9:00 o'clock.
The move after 9:00 is back to 6:00 o'clock, then 4:30, then 3:00, next back to 6:00 again. Some riddlers will go to the 10:30 and 1:30 bottle mark.

The process is repeated.

The bottle is gradually being raised with each turn to a vertical position. You must inspect the sediment in the bottle to gauge the rate of movement to a vertical position.

Remuage is not as difficult as the commercial producers would lead you to believe. Their problem is to find an employee who is willing to do this all day, five days per week. It is not surprising that machines are replacing riddlers. In the book WINES WITH A SPARKLE authors Restall and Hebbs talk about placing a case of unriddled wine in the truck of a car. In very cool weather, the mobile remuage evidently works. The vibrations from the traveling car dislodge the sediment from the sloping shoulders of the bottle quite effectively. Pay close attention to what is happening in the bottle. You should not have a difficult time with riddling. You do not need pupitres to riddle your wine, though you can buy or make them if your cellar is enhanced by their presence.

RIDDLE BOTTLES & STORE ON POINT

Doing 6 to 12 bottles at a time will give you a continuing supply of consumable wine. The riddled wine must be stored on 'point', upside down on its crown cap. This upside down storage keeps the sediment where we want it. If the wine becomes upright, you will have to riddle once again. Use cardboard shipping cases for your storage or moving. Remember you are dealing the dangerous, explosive devices.

The largest loss of wine I have seen with amateur winemakers is from leaking bottles. Leaking bottles should be removed from your storage stack. Partially full bottles should be shaken vigorously and placed in a cold refrigerator point up (standing on their bottoms). Employ the ancient method of serving sparkling wine used before the discovery of remuage. Depotage is simply the decanting of the chilled wine from the bottle containing yeast to a clean bottle. This is what most home beer makers do. One way to salvage leaking bottles is to decant the chilled wine into at least two wine glasses and a wine decanter.

Toast to the fine things in life and enjoy. The other way would be to decant a chilled leaky bottle into a partially filled, well-chilled leaker. Only combine wines that have good carbonation. Recap immediately and store as a separate lot. Treat in the same manner as the remainder of the lot. Those bottles not displaying sparkle should be used as dinner wines.

Sparkling wines 'on point' may be stored in your kitchen refrigerator. I keep the top of a styrofoam, UPS wine shipping container always full in a spare refrigerator. Be prepared! In Connecticut, I've seen lines of bottles sticking out of the snow for family celebrations.

DEGORGEMENT / DISGORGING

The clearing of the bottle of yeast sediment is the most spectacular part of the methode champenoise. The opening of a sparkling bottle of wine is always a celebration. It is also the most common cause of eye injury in the United States. The opening of an undisgorged bottle of sparkling wine is three plus times as dramatic and dangerous. Commercial champagne has already been disgorged, with subsequent loss of pressure, before the celebrated opening for consumption. Even with lowered carbonation levels, the opening of your home sparkling wine will be more forceful than the fully carbonated commercial wines. Wines prepared at home at the full champenoise level are extremely powerful. The disgorgement of the yeast should take place outside, on the back or front porch. A plastic apron is appropriate attire for the event. I would recommend practicing the following procedure with a water filled champagne bottle before attempting the real thing.

A small issue in the actual opening has to do with the bottle opener. The Champagne folks have developed a bottle opener that will open the crown cap so the sediment, etc. flies away from you. The opener reaches over the crown cap and lifts it from the bottom, allowing the spent yeast an unobstructed flight. Using a standard 'American' opener will splash a portion of the sediment back at you - thus the need for an apron. This detail is difficult to explain, but will become apparent upon your first disgorgement. Don't worry, just wear a waterproof apron, and know there is a simple device(s) that will make this job less messy.

DISGORGE - *A LA VOLÉE*

The dégoregement 'A la Volée' is the traditional method of disgorging the yeast from a bottle in the cave (cellar) of a small, individual Champagne vigeron (grower/winemaker). The wine is chilled prior to disgorgement, but the wine in the neck of the bottle is not frozen. The chilled wine allows for a more spontaneous enjoyment of the wine then the process of freezing prior to disgorgement. The 'A la Volée' disgorgement of yeast from the bottle may be done just before consumption of the wine.

It is important that the 'on point' bottles be refrigerated for at least three days. I do not know the science, but it takes a cold, calming period of at least 48 hours, better if more, before the loss of wine is insignificant.

Have a wine glass ready to receive the first few ounces of wine. Make sure the sparkling wine has been chilled for at least three days, as cold as possible. The disgorging of your wine is simply the uncapping of the bottle with resultant discharge of bidule and sediment. The bidule is not critical but the expulsion of the sediment is what this is all about. The critical element is when to uncap the bottle. The image of a clock will be helpful in explaining when to uncap. The bottle is in a point position when the crown cap is in the six o'clock position (pointing down) and the air bubble is in the punt (bottom) of the bottle, 12:00 o'clock position. The bottle must be rotated in one fluid movement so the crown cap ends up in the 11:00 o'clock position. The air bubble moves from the bottom to the top of the bottle. The wine should be uncapped when the crown cap reaches the 10:00 o'clock position during its continuous motion from the 6 o'clock position. An aid in uncapping is the bubble in the top (bottom) of the bottle. As you rotate the bottle, the bubble will migrate along the side of the bottle, moving towards the cap. The rotation should be a constant fluid motion. When the bubble reaches the shoulder of the bottle, uncap it and keep rotating to the 11:00 o'clock position. Pour your wine into the nearest glass (a strong thumb over the opening can briefly retain the eruption). The wine should be perfectly clear and full of a creamy stream of bubbles.

Large commercial producers will often disgorge 'a la glace'. In this method the neck of the bottle is frozen in buckets of ice and salt. It does allow a smaller loss of wine than the 'A la Volee' method and much more premeditation.

DRINK AND ENJOY!!

The above represents the basic recipe for "Method Traditionnelle - CHAMPENOISE. Try your wine natural, without addition of sugar or spirits. Open & enjoy! Most home champenoise is consumed *a Naturel*. It is easier, not requiring recapping, labeling, and storage (time). It does mean the acid has to be tolerable.

Travel may behoove you to disgorge and recap. Freshly disgorged wine will keep for days. The impregnation of the CO2 inhibits oxidation and keeps the wine fresh. If you are going to visit friends, disgorge before leaving and immediately cap your wines with a crown cap. I have disgorged three bottles, topped up two to take and left the third for dinner the next evening. Just recap. Life goes nice with low alcohol and a fine sparkle.

The final, critical elements you must provide are sparkling wine glasses, remember, fluted or deep-hollow-stemmed only!

DOSAGE, TOP, RECAP, LABEL:

If your Champenoise style wine does taste too tart, add tirage sugar syrup to your disgorged sparkling wine. This usually requires processing a group of bottles at one time. Disgorging, adding tirage sugar syrup, topping up, and recapping. Give it a good shake to mix

dosage and wine. The wine should be ready for consumption within two weeks. French champagne's initial commercialization was done as a sweet wine (had not perfected malolactic fermentation), the favorite of the Czar! The following are general sugar ranges for different styles; the amount of Tirage syrup is approximate:

Natural/natur/pas dose'/brut absolu:
-0 sugar, Bone dry
Brut, English cuvee:
-0-5 grams per litre, 2 ml. Tirage syrup
Brut:
-5-15 grams/litre, 5 ml. Tirage syrup
Extra dry, English cuvee:
-5-15 grams/litre, 8 ml. Tirage syrup
Extra dry/extra sec:
-10-25 grams/litre, 12 ml. Tirage syrup

After adding the desired amount of sugar solution, fill the bottle with the same wine into the small of the bottle's neck. Seal with crown caps. The only reason to use corks and foil is to appeal to the consumers' sense of quality by appearance -- crown caps are better, by far.

Happy Fermenting,
Peter Brehm
Brehm Vineyards®
www.BrehmVineyards.com

Customer Feed back:
Encapsulated Yeast has been introduced since this was written.
Tom M. shared his experience:

I ferment the Cuvee at a very cool temp (about 50 degrees) as you suggest with DV-10 or I also have liked D-47 on the Chardonnay with regular dehydrated yeast. I follow with a malolactic fermentation and then fine the wine with bentonite just as you would along with cold stabilization. I make sure to have around 15 p.p.m. or less so2 in the wine after Malolactic Ferm. When the time comes to bottle, I have an Enolmatic bottle filler with two in line filters so my wine gets filtered with a 1.0 micron filter and a 0.2 micron filter for total yeast removal (I used a 0.45 micron in the past for sterile, but I would have a little sediment in the bottle from yeast)(most likely the inaccurate filter rating p.b.). *Just before bottling I add my sugar (dissolved totally in a small amount of the cuvee) and 10 p.p.m. of so2. In the past I have added by weight a measured amount of Dry Encapsulated yeast to each sanitized bottle before filling. It did work, but with inconsistent results. Very slow to carbonate and occasional failure to bring wine to dryness were some of the issues. Last year I had a batch that did not carbonate at all or just partial carbonation.*

This time I decided to follow the Instructions for " Making A Starter With Encapsulated Yeast For A Stuck Fermentation Under Difficult Conditions". I also added a little yeast nutrient to the starter. When the starter was finished, I weighed up the proper amount of the fermenting Encapsulated yeast for a 750 ml. bottle and it came to equal 1 heaping teaspoon. So I uncapped each bottle and added the heaping teaspoon of active yeast to each one and recapped. The results were amazing!!! This I have decided is the way to add the Encapsulated yeast, by using a starter. I could tell in a couple days there was CO2 being produced and the wine was taken to dry in no time. I kept the

bottles at room temp. for 3 weeks (just to be safe) and then cellared. I have not had one failure on this batch. Adding the Encapsulated yeast dry was no longer an option for me. I have NO issues with any yeast sediment left in the wine after switching to a 0.20 micron filter. The wine being fermented cool with the D-47 on the '05 Chard and DV-10 on the '07 Pinot Noir kept a nice fruit profile in the Cuvee so we found there was no need to add any Dosage for balance in the finished wine. note; The two cuvees had a nice balance of acidity with 60g. tartaric acid added total to the 2 pails of juice before fermentation.

As far as the great Bread character we wish to get from aging on the yeast lees is still up in the air as we have not had sufficient time to age any of the wine this way. I am optimistic though as my wife and I believe that after this short aging period, there seems to be hints of this characteristic developing. Only time will answer this question.

I hope this was helpful and I wish to thank you for offering us all of these great grapes from all of those great vineyards. As a wine collector, it adds another layer of enjoyment and excitement to the hobby of wine making. It is also fun searching out wines from these same vineyards. Thank you so much.

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CH of San Diego prefers his unique method of 'A la Glacé' disgorgement. He recommends using a sturdy, sparkling wine carton and a piece of dry ice. Take the bottle dividers out of the wine case and place the slab of dry ice in the bottom of the case. Return the dividers and add, on point, the prepared, riddled, chilled wine. The cap and sediment will quickly freeze in contact with the dry ice - monitor closely. Once the sediment is frozen in the neck of the bottle, turn it over and uncap it. Place the bottle upright on a flat surface. Stand back for the sediment to launch.... a popping good time.

Vinification by Encapsulated Yeast: Champenoise Style

The following is a new process that requires experimentation. I encourage you to give it a try and share your results.

A laboratory in Portugal has provided a method / product that separates the wine from the yeast. They encapsulated the yeast! The yeast is enclosed in a semi rigid polymer of calcium alginate. The yeast can react with the wine consuming the sugar and producing alcohol and CO2. The rigid encapsulation is made from seaweeds. The seaweeds, in the presence of calcium chloride turn into calcium alginate – the semi rigid polymer. These capsules are about 2mm in diameter.

I am about to embark on experimenting with this yeast. The yeast itself is DV – 10 recommended in the traditional method. This yeast would only be added for the bottled fermentation. This immobilized yeast would demand a different protocol:

The wine to be bottled would need the same sugar addition, but without the use of bentonite. In that the yeast is encapsulated, it will not stick to the bottle.

This yeast may be directly added to the sparkling wine bottle without any acclimatization for alcohol; without any starter – *see Tom's experience above*

The riddling process is eliminated. The immobilized yeasts have a higher density than the wine. Turn the bottle over and the yeasts fall – no sediment. The general manager of the laboratory has told me that the pressurized wine bottle may be opened without disgorging the yeast. The yeast remains in the bottle as you fill

the glasses. No CO2 explosion, no spry. This I would love to see.

I have been assured that the flavor of the aging yeast will still permeate the wine even though there is no visual sediment. This is the main attribute I need, and I implore your input, to confirm. Whether the wine will achieve more yeast character on its side, or standing up, needs to be explored.

As with all things in life, there is the other side, other steps required to achieve a healthy, encapsulated Champenoise wine:

-As with the traditional method, the wine to be put in the bottle should have a low SO2 content (<15 mg/L), the pH should be 3.0 or higher, alcohol should be 11.5% or less. It is imperative that it is protein and tartaric stable, and the fermentation be conducted at a cool (55°F) temperature.

-The wine **must** be free of viable yeast. The wine must be very clear. If there are yeasts in the wine, they will also consume the sugar to be added at bottling. The free yeast will then settle in the bottle. Without bentonite, they will, with time, stick to the bottle. This would be a very serious problem.

-Not only must the wine be free of yeast, there can be no further contamination in bottling. This means that hoses, filler, caps, everything in contact with the wine must be yeast free. The wine cannot be treated with sorbate. A well-stocked cellar may be able to filter out foreign or initial ferment yeast. A membrane cartridge, that may be pressure (bubble point) tested, filtration at 0.6 microns may work, a 0.45 final, membrane filtration is recommended. The filtration would happen after sugar addition, immediately before bottling.

Sparkling feedback requested!

Peter Brehm

Notes: