

Salvia Divinorum Salvinorin Extraction and Refinement FAQ.

April 5, 2006 by Sphere



This extraction and refinement method was worked out and written by an amateur experimenter at a time and place where legal to do so. If you are in Australia or in one of the few locations in the world where Salvia divinorum and salvinorin have become regulated please do not be encouraged by this document to do something illegal and obey all local laws pertaining to this plant and extract. The solvents mentioned in this document are very flammable and can be easily ignited by red hot surfaces, open flame, electric or static spark! I am not an organic chemist and am not a trained professional in a field related to botany, chemistry or the manufacture of medicines or pharmaceuticals. Because of this I am unable to advise you how to safely handle and work with solvents or advise on their proper use for the manufacture of human consumable products. This document is not intended to imply that anything produced by this method can safely be used as a food or drug. If you plan on doing this yourself do not solely rely upon this document as a proper guide for either the safe use of salvinorin as a drug or the proper manufacture of salvinorin infused materials intended for human consumption. To read more about the negative effects of smoking too large an amount of salvinorin whether pure or infused into smoking materials read the warning at this link: <http://www.sagewisdom.org/caution.html>

I do not advocate or recommend the use of Salvia divinorum or any other psychedelic plant because their use is not right for everyone. Salvia divinorum and its active principal salvinorin A is an extremely potent psychotropic substance which when taken in relatively large amounts can also be strongly inebriating. Due to the intensity and sometimes startling effects produced from the use of this entheogen individuals intending to partake of this plant in any form should thoroughly study the complete range of possible effects before use. If you have made the decision to use Salvia divinorum only do so in private settings with a responsible and sober sitter present, never in public areas or prior to operating machinery of any kind. The dosing of either crude or refined salvinorin as a drug should never be attempted, salvinorin-A is far too potent to eye ball a sub-milligram dose which can only be accurately done if using an analytical balance with accuracy within a tenth of a milligram or better costing many hundreds of dollars or more. Use this process or smoke Salvia divinorum or salvinorin enhanced materials at your own risk!

How do I extract *Salvia divinorum* leaf, should it be whole, crushed or powdered?

When I first started extracting *Salvia divinorum* leaf with acetone I found that it didn't seem to make any difference whether the leaf was whole, crushed or even finely powdered, regardless I found that salvinorin was extracted from leaf from whole to finely powdered with the same efficiency. Since acetone worked so well with whole or crushed leaf my assumption was that most, if not all of the salvinorin was coating the outside of the leaf instead of inside the leaf, either that, or acetone was somehow able to efficiently draw the salvinorin out of the interior leaf membranes. Daniel Siebert recently published a paper confirming my belief that salvinorin is concentrated on the outside of the leaf, because of this it isn't necessary to powder the leaf to be able to efficiently extract salvinorin using any solvent which salvinorin can be dissolved into. When I extract large amounts of dried leaf with acetone I usually just hand crush the leaf as fine as I can and then add enough solvent to completely cover the leaf with an extra inch of solvent over the top of the leaf.

The solubility of salvinorin in acetone at 27 degrees C. has been reported to be 23 mg per ml of acetone .74 mg per ml of isopropyl and 1.28 mg per ml of ethanol. On this basis 100 grams of *Salvia* leaf containing an average of 2.5 mg of salvinorin per dried gram should only need a few ml of acetone to extract the salvinorin but that amount of fluid is far too little to be able to completely cover finely crushed leaf. If the leaf is finely powdered to the consistency of flour you might want to calculate the amount of salvinorin in the weight of powdered leaf to determine the amount of solvent needed but otherwise I wouldn't even worry about it, especially if extracting your batch of leaf two or three times over as recommended.

Although *Salvia divinorum* leaf does not require fine powdering for extraction of the salvinorin if you powder the leaf from a volumetric standpoint far less solvent is needed to extract the leaf but you need to be sure to use enough solvent. For example, if extracting powdered leaf using 99% isopropyl it is possible to completely cover the power with solvent but not have enough solvent to hold all of the salvinorin contained in the leaf, reaching the upper limit of its solubility for salvinorin. Because of this I like to use three or more times the amount of solvent technically required to dissolve the amount of salvinorin I am extracting from the leaf, especially when using either isopropyl or ethanol which take longer to dissolve salvinorin compared to acetone but will also yield just as much salvinorin as acetone extractions if given enough time.

What is the simplest way to get salvinorin out of leaf without lots of work?

The easiest way I know to obtain high enough purity salvinorin to make salvinorin cigarette papers is to extract dried whole uncrushed *salvia* leaf in close to zero degree F. acetone for one minute to three minutes, stirring the leaf in the solvent the whole time. Remove the leaf and wait 12 to 24 hours for the fine plant sediments to fall to the bottom, pour off and then evaporate.

This simple method will produce nearly pure salvinorin! Not all of it will be removed from the leaf but a third or more should be. Nothing easier! Although I find the salvinorin to be purer if extracted for one minute using -20 degree F. chilled acetone, zero degree F. works well enough but will leave lots of salvinorin behind. Because of the salvinorin left behind the leaf should be extracted two or three times more over and keeping the solvent from the last two re-extractions of the leaf separate from the first short term extraction because it will contain far more of the dark waxy impurities..

While waiting for the ultra-fine particles of leaf to fall out of the acetone be sure keep the solvent in the dark the whole time to prevent UV interaction with the salvinorin in the fluid which can decrease and completely destroy the potency if the salvinorin containing acetone is left in direct sunlight too long. Evaporate in darkness if possible but keep out of direct sunlight at all times.

Can I use water to extract salvinorin from leaf?

I am mentioning this for individuals who may have a difficult time obtaining solvent to extract leaf. While salvinorin is insoluble to water I did find that at least half of the salvinorin can be removed from leaf by hot water. Two years ago I extracted half of the salvinorin out of leaf with nothing but boiling water. I boiled that leaf three times over for hours and still couldn't get the last half of it without solvent. Perhaps if I had poured in some IPA it might have done much better. After I was done boiling the leaf I dried it in an oven set to 150 degrees F. and once completely dry re-extracted with solvent to get the second half of the salvinorin out. To get the salvinorin out of the water I evaporated all of it in an oven overnight, taking many hours to evaporate down to dry tannin which I then extracted using a small amount of acetone.

I believe if I had taken all of the water I poured off of the leaf and instead of evaporating it set it aside for 24 hours the salvinorin which is insoluble to water would have settled to the bottom and then collected for refinement. However, some individuals fear that boiling leaf in water will hydrolyze the esters of the salvinorin molecule causing it to become weaker but I did not find this to be the case with my extract when doing a bio-test. This is only an issue if the water has a high pH.

Some individuals pre-wash their leaf with cold water to remove tannin before drying the leaf again for extraction with solvent. While this will remove some of the tannin from the leaf I don't recommend it because a portion of the salvinorin can be mechanically removed or carried away when the leaf is softened by water. While this can be used to your advantage to extract salvinorin into the water I find working with water to be a lot more work than using solvent.

What is the simplest *Salvia divinorum* extraction and refinement method to get the most of the salvinorin out of leaf with the least amount of steps?

For a super simple extraction and refinement method you could extract crushed *Salvia* leaf three times over for 5+ minutes each time with 99% isopropyl AKA isopropanol, same thing.

After removing all of the leaf bits from the 99% isopropyl completely evaporate the isopropyl in a bowl so the extract solids will all collect in the bottom. Once all hint of the isopropyl smell is gone and while the extract solids are still wet with water moisture add a few ounces of water to the extract and mix into the solids to dissolve the bulk of the water soluble tannin into the water, waiting for all of the salvinorin extract solids which are not soluble to water to fall to the bottom of the container before carefully pouring the brown colored water off.

Continue washing the extract with a few ounces of water and waiting for the particles of crude salvinorin extract to settle to the bottom of the container each time washing the extract solids, carefully pouring the water off each time taking care that none of the extract particles flow out with it. Continue washing the solids until the water no longer continues to take on any color and is clear and free of cloud.

Next completely dry the extract of all water moisture and begin removing the dark waxy compounds from the extract by washing the extract solids with very small amounts of 99% isopropyl. Methods of refining or cleaning the extract solids with 99% isopropyl/IPA explained in the text below.

Note: Upon complete evaporation of the 99% isopropyl used to extract the leaf the 1% water left from the IPA will remain in the evaporation bowl. Do not pour the water out or allow the extract solids to dry or this method won't work because the waxy fats and lipids in the leaf will congeal to form a barrier to the water if allowed to dry.

Save and set aside the water used to wash the extract solids in one container, after a few hours check to see if ultra fine salvinorin particles have continued to fall out of the fluid. If the water has a white or green milky appearance this is likely due to an amount of salvinorin remaining in the water, especially if an amount of solvent was still in the extract when adding water to wash the tannin out of the solids. If the water is at all milky wait for all cloudiness of the water to settle to the bottom of the container before pouring the water off which may take 24 or more hours.

If you have not removed most of the tannin using water and try to refine the extract into a white purity using 99% isopropyl at some point when trying to wash the extract to a white color it will start to darken to a light brown or grey color as the amount of salvinorin in the extract is reduced with each wash of the solids. It is important to remove all of the tannin possible through the water washes of the extract before washing the extract with 99% IPA. The tannin impurities are extracted from the leaf when using solvents with an appreciable amount of water in them, such as 99% isopropyl. That amount of water might not seem like much but it will pull a fairly significant amount of tannin out of the leaf along with the salvinorin and should be removed before trying to purify the extract by washes of water to the crude salvinorin.

When extracting leaf, in addition to tannin being extracted from the leaf, no matter what solvent is used, whether it contains much water or not a large amount of ultra small micron sized particles of plant matter are also removed from the leaf which will need to be filtered from the extract prior to attempting to further refine using 99% isopropyl. To confirm that most of these small particles or sediments have been removed from the extract, after the water washes completely dry the solids of all water moisture and dissolve into 100 ml of acetone (for 500 gram or less extractions) and wait 24 hours to see if the fine sediments fall out of the fluid. If they are still in the extract the acetone will be clouded by the fine sediments making it impossible to see through the fluid, make sure to wait long enough for the particles to fall out of the fluid so the acetone is translucent and without cloudiness before pouring off of the fine brown sediments in the bottom for evaporation.

Is there a simple way to make enhanced leaf?

The following is as simple as it gets to make a gram of 5X enhanced leaf (~12.5 mg salvinorin per gram of leaf):

1. Pour enough room temperature acetone into a glass container to completely cover six grams of finely crushed *Salvia divinorum* leaf and stir for three minutes or longer.
2. Pour acetone off of the extracted leaf into a glass bowl containing one gram of un-extracted finely crushed leaf and evaporate all acetone while leaf is present in it, mop up all of the residues from the sides of the container with the leaf as the last of the solvent evaporates out.
3. Once every hint of solvent smell is gone from the leaf, Wha-la! Enhanced leaf. Store out of the light, cold storage is better than warm, especially a freezer to assure many years of full potency.

Note: When using the sample method of making enhanced leaf I like to use an extra amount of *Salvia* leaf to make up for possible extraction inefficiencies. In this simple method six grams of leaf are being extracted and placed back on one gram to make 5X leaf. Since a total of six grams is being extracted to place back onto one gram of leaf the total amount of leaf used is 7 grams to make one gram of 5x which should be every bit as potent as standardized 5x leaf, more than likely closer to 6x. Want to make something stronger using this method? Not recommended because of the increased amount of waxy lipid compounds placed back onto leaf in higher concentrations any more than a ratio of 6 to 1 is about as high as you can go without ending up with a very gummy and harsh burning leaf which produces too much smoke for most people to hack.

I want to make my own low smoke extra salvinorin infused standardized leaf, how can I do that?

This is a brief summary of the lengthy extraction write below it without the water wash of the dried extract (either prior to or following the naphtha washes) or the extra purification process of using 99% isopropyl. This method of refining salvinorin is a reasonable equivalent to true standardized leaf but unless extreme care is taken to assure the all of the tannin has been removed from the extract will not approximate standardized leaf. True standardization of enhanced *Salvia divinorum* leaf requires knowing the purity of the salvinorin which requires more sophistication than found in most homes however this method will work to produce 80% to 90% or higher purity salvinorin (with experience) and is fairly easy to do using the methods outlined below.

With extra care salvinorin which is close to 95% pure can be produced through the refinement methods outlined in this document but unless you have a real need for high purity salvinorin is not worth the extra time and expense needed to produce it. Lower purity extract can be used to enhance leaf which is every bit as potent as a true standardized leaf by simply using more extract to make up the difference for being impure.

A rough approximation works very well for this and can easily be calculated by simply extracting from a given weight of dried leaf which is then deposited on a fractional amount of dried leaf plus 15-20 percent more extract than the strait math indicates to use. For example, if having extracted from 100 grams of dried leaf (oven dried at 125 degrees F. first to remove moisture) one might assume that amount of leaf could make 10 grams of 10X enhanced leaf. Due to processing losses you may only be able to make 8 grams but those eight grams should be every bit as potent as a true 10X standardized leaf because you are making up for common extraction losses.

You can't claim a true standardization, but at the same time make something just as good, especially if you have remove most of the waxy contaminants from the extract. When most people buy "standardized" most are only after a guarantee of a minimum while at the same time wanting to be able to gauge how much material they need to smoke for a given effect so be careful not to put too much refined extract back on the leaf. Daniel Siebert at www.sagewisdom.org recommends no more than 15 mg of salvinorin per gram of leaf as a maximum amount but to make 10X leaf requires more. Although some individuals are attracted to higher X factor enhanced leaf believing that more is better, the truth is 5 to 6X strength leaf made by infusing ~15 mg into a gram of leaf is plenty potent enough and far less problematic to individuals who might either be new to *Salvia* or who are not taking enough care to accurately measure the amount of material they are smoking.

Here is a simple outline of the more involved process I use. This outline does not match number for number of the more detailed extraction write below it but gives a fairly strait forward view of the process:

1. Dry leaf in an oven set no higher than 150 degrees F for however long it takes to remove all moisture. Most "dried" leaf from vendors contain close to 10-15% water moisture by weight.
2. Crush the leaf by hand as finely as you can.
3. Soak leaf in acetone for 3 minutes, stir, save and pour off and save.
4. Repeat 3 times.
5. Discard leaf.
6. Add all of the acetone from each of the three extractions to the same leaf together into a bowl and then let sit still for 12-24 hours (the longer the better but in a dark place away from light) so that the ultra fine particles of plant material have time to fall out of the fluid. The acetone can be filtered using paper filters with a buchner filter funnel but I usually just wait for these fine sediments to fall out of the fluid instead of filtering.
7. After settling pour the acetone off of the fine sediments in the bottom into a separate bowl or container being careful not to stir up the fine particles while doing so, discard brown colored residue left in the bottom of the settling container. A small amount of salvinorin will remain in these sediments but for small extractions I don't bother trying to recover it.
8. Evaporate the acetone extraction solvent completely out, do this in a dark place away from direct sunlight or other UV source of light such as florescent lighting which can destroy a portion of your yield. Pour off and save any amount of water found after the evaporation of the acetone because this may contain a substantial amount of salvinorin in it, especially if the water has any of amount of diluted acetone in it. Evaporate separately in a small custard bowl but take care not to put near possible sources of ignition if any amount of acetone remains.
9. Upon complete evaporation of the extraction solvent naphtha can be used to remove the waxy lipids and chlorophyll from the crude salvinorin extract solids. To successfully remove most of these waxy compounds (AKA black wax) it is very important to crush all of the extract into as fine granules as possible while in the naphtha. After all of the lumps of extract have been completely dissolved then let the naphtha sit completely still for an hour or longer to allow most of the fine particles of salvinorin enough time to settle to the bottom of the container.
10. Pour the naphtha off of the extract solids leaving the salvinorin residues which have settled to the bottom behind. (Save the naphtha, more will settle out after 12-24 hours).
11. Add more naphtha to the extract solids, stir, let set long enough to completely settle out again.

12. Continue washing the extract solids with naphtha until the fluid no longer continues to become a lighter shade of green with each wash of the extract, allowing enough time for the fine salvinorin particles to settle to the bottom each time.

13. When satisfied you have removed enough of the chlorophyll pour off every drop of naphtha and dry the extract.

The dried extract produced by the above process is fairly crude compared to what you can make through further refining using small amounts of 99% isopropyl to wash out more of the contaminants as explained in the more detailed tech (below), regardless, the purity from this rather simple method is plenty high enough to make enhanced leaf which is just as good and low smoke producing as expensive 5x to 25x standardized leaf which you can pay from 15 to 50 dollars or more a gram for, depending upon the amount of salvinorin infused into it.

When enhancing leaf with the extract produced by this process make sure to completely dissolve every bit of the extract solids into acetone and then pour over a quantity of crushed leaf and evaporate. Do not use more solvent than is needed to completely dissolve the extract while at the same time assuring that all of the extract solids have completely dissolved. Continue to stir the leaf into the acetone as the last of the solvent evaporates. If you want to get all of salvinorin you can mop up the light residues of salvinorin which will evaporate on the sides of the container with pieces of the leaf while still moist with solvent but this will cause hot spots on the leaf which some individuals are wary of, either being fearful (for good reason) that they might get too much salvinorin or incorrectly assume that the spots were created by mold or something.

If you find that you have some hot spots of lightly colored spots of salvinorin on the leaf you can average them out by finely crushing the leaf and thoroughly mixing but it is better to have a smooth consistency of enhanced leaf than having inconsistent hot spots of salvinorin pooling up on portions of the leaf. To reduce the amount of hot spots of salvinorin produced on the leaf I no longer mop up the last of the salvinorin from the edges of the evaporation container as the last of the solvent evaporates from the leaf. When I am finished enhancing a batch of leaf I dissolve all of the residues left in the container used to make enhanced leaf with a small amount of acetone, washing the inside of the container so that every bit of the light salvinorin films are dissolved into the acetone and then evaporate the solvent and weigh the remaining salvinorin solids to know how much was left behind. This way I can know the approximate x-factor of the leaf I had just made. If you do this, after a few batches you should be able to know how much salvinorin is usually left behind on the sides of the container and can then add that much more salvinorin to the acetone each time you make a batch of enhanced leaf.

To approximate how potent your enhanced leaf will be, divide the amount of leaf extracted in grams by the amount of leaf you are infusing the extract into and subtract 10-15% for a rough "x" factor estimate which should be every bit as strong if not more potent than true standardized leaf.

The following was written for 100 to 250 gram extraction of dried *Salvia divinorum* leaf to make high quality Standardized leaf:

WARNING: DO NOT ATTEMPT TO USE CRUDE OR REFINED SALVINORIN AS A DRUG. IT IS FAR TOO POTENT, ESPECIALLY WHEN IN CRYSTAL FORM. 5X Enhanced leaf is less than 1.5% salvinorin by weight.

This extraction and refinement method will work for any amount of leaf, if using 25 grams of leaf instead of 100 grams scale the amount of solvent down by one quarter the amounts suggested. Nothing outlined in this extraction process requires extreme exactness to work and uses nothing more than simple kitchen utensils and household solvents. The following process can be used to extract and refine salvinorin into a purity that is in the high 90 percentiles:

1. Extracting leaf: Extract finely crushed leaf in a glass, ceramic or stainless steel container (no plastic bowls or utensils) using room temperature acetone three times over for 3 minutes each time completely covering the leaf with fluid each time, longer if desired. When using acetone to extract the majority of the salvinorin is extracted from the leaf in the first of the three 3 minute extractions, but I recommend extracting the leaf three times over just to be thorough. If using room temperature 99% isopropyl/IPA or 98% ethanol alcohol it is very important to thoroughly extract the leaf at least three times over for at least five minutes each time, longer if desired. Whether extracting with acetone, isopropyl or high proof ethanol shake or thoroughly stir the leaf into the solvent the entire time the leaf is in the fluid.

Note: *This will work with whole unbroken leaf just as well. I prefer to crush my leaf to reduce the amount of solvent needed to completely cover the leaf. The amount of solvent needed to hold the salvinorin extracted from the leaf should always be in excess of the amount of salvinorin contained in the leaf. Regardless of which solvent you use to extract your leaf, if you finely crush the leaf by hand (not powdered) the amount of solvent needed to extract the leaf is only the amount required to completely cover the leaf with about an inch of fluid on top, especially when doing multiple extractions on the same leaf twice or more. Because the majority of the salvinorin contained in *Salvia divinorum* leaf is actually coating the outside of the leaf instead of inside whole or broken leaf can be extracted just as effectively as finely crushed or even powdered leaf, but when only moderately broken or whole requires far more solvent than needed on a solubility basis to completely cover the leaf.*

If using 99% isopropyl or high proof ethanol to extract leaf, warming these solvents to 100-120 degrees F. will make them more soluble for salvinorin which is exactly but when heated will also produce far more vapors which increase the potential of fire from any kind of static or electric spark, open flame etc. which the vapors may reach to ignite them. However, room temperature ethanol will do the job just as thoroughly if soaking the leaf long enough and extracting several times over. If using ethanol to extract leaf I do not recommend 151 proof. Perhaps 190 Proof will work just fine for this kind of quick extraction, but I have never used it to know for sure myself. 99% medical grade isopropyl is much cheaper than drinking alcohol just as clean and although the solubility of salvinorin to isopropyl and other alcohols is far lower than acetone it will still do the job extracting all of the salvinorin out of the leaf at far less cost than high proof drinking alcohol.

2. Washing the leaf through again: This may not be necessary but to assure as much salvinorin possible has been removed from the leaf after completing the outlined number of extractions to the same batch of leaf thoroughly wash the wet leaf through once more with fresh acetone (or what ever extraction solvent your using) to further remove residuals. This is done to dilute out all of the old solvent remaining in the wetted leaf which could still contain some of the salvinorin. At this point your done with the leaf might want to place all of your previously extracted leaf into a jar with solvent for a long term extraction to get what ever amount of salvinorin that might have remained behind in the leaf which should be very little if any, especially if having used acetone. Re-extract the leaf as long as you like, but keep it in the dark to prevent any loss of salvinorin from long term exposure to UV light which can destroy a portion of the salvinorin while in solvents.

3. Combine all of the extraction solvent, filter sediments or wait 24 hours to settle: Combine the solvent from all extractions and last washes, remove all leaf and fine leaf particles, filter the fine sediments from solvent by pouring through a buchner funnel or let the solvent stand undisturbed for 24 hours to allow enough time for most of these sediments to settle out of the fluid. While waiting for the ultra-fine particles to settle cover your container and store in a cool dark place to both reduce evaporation and to prevent possible losses due to interaction of light.

Once you have waited at least 24 hours for the ultra fine particles of plant material to settle out of the fluid slowly pour the extraction solvent off of the fine brown sediments which have settled to the bottom of the container, being careful to handle the container very slowly without jarring or sloshing the fluid to prevent the fine particles from being stirred up into the fluid. In large extractions where you are working with lots of fluid I don't recommend trying to pour out the last ounce or two of solvent out of the settling container because a portion of these sediments will usually flow out with the last of the fluid. Although, when leaving a small portion of the fluid behind a dilute portion of the salvinorin is still in it you can recover it by adding a few more ounces of fresh solvent to the fluid and vigorously swirling the tannin into the solvent for a couple of minutes to make sure to get any that might be left in it too, then waiting another 24 hours to settle again before pouring the fluid off again. Of course, you will have to leave the last bit of fluid behind the second time too.

***Note:** I have tried using paper coffee filters to remove these micron sized sediments from the extraction solvent, but even after pouring the extraction solvent through paper filters stacked three ply several times a fair amount of the tannin particles were still able to get through the papers. A filter made of cotton balls in a glass tube might work better than paper filters, but I haven't tried it to know. Using a buchner funnel with filter papers have been reported to do a good job but I haven't been using anything that fancy. When waiting for these fine particles to settle, because the amount of solvent used to extract the leaf the salvinorin will completely dissolve into the acetone so there is no fear of salvinorin falling out of the fluid, only the fine impurities that will fall to the bottom of the container. These sediments should be saved for further processing by later swirling the sediments into fresh solvent and let to settle out once more be sure that none of the salvinorin was left behind in them.*

4. Evaporating the extraction solvent: After the extraction fluid is poured off of and separated from the brown tannin sediments, completely evaporate the solvent. This is best done using a large flat pan so that the fluid volume will spread out much further than when using a bowl because the shallower the pan the larger the surface area of the fluid, speeding the rate of evaporation requiring far less time than if using a deep bowl. You can increase the evaporation rate even further by using a fan to blow air across the solvent with enough force to cause ripples on the surface of the fluid, but not so much airflow that droplets start taking to the air carrying away any amount of your precious extract. If you live in a buggy part of the world covering the evaporation container with a fine mesh screen which will both allow air to flow through and keep bugs out might be necessary. A full gallon of 99% isopropyl can be evaporated in under eight hours with this method and a gallon of acetone in four hours or less.

Due to rapid evaporation of acetone, condensation from the air can cause an ounce or more of water to remain in the container which won't evaporate quickly and should be poured off because it will contain a considerable amount of tannin. Also, if you have extracted leaf using 99% IPA or 98% ethanol in addition to water from condensation you will have a percent or more of water remaining from the extraction solvent itself. This water is usually a yellow color due to tannins dissolved into it which *may also contain a large amount of ultra fine salvinorin particles* so be sure to pour the water off into another container for separate evaporation to check for salvinorin. Before pouring the water off be sure there is absolutely no smell of the extraction solvent remaining in the fluid, being careful when pouring that none of the green particles of extract go out with the water too.

***Note:** A large flat glass casserole cooking pan works very well to evaporate the extract into, the broader the better. When the fluid level is being reduced by evaporation thin films of relatively high purity salvinorin are always deposited on the sides of the container, be sure to scrape or wash these films off of the walls of the evaporation container with solvent that can be evaporated separately to net an amount of high purity salvinorin.*

4.5 Removing more tannin from the extract while still wet: At this point you could remove more of the tannin from the extract if all hint of solvent has been evaporated off but the extract is still water wet from either condensation of water due to rapid evaporation of solvent or wet from the 1% of water contained in 99% isopropyl. Smell the extract solids to see if they have any hint of solvent left in them, if they don't then scrape up all of the moist extract solids and place them into a an ounce or more of warm water and stir for a few minutes, breaking the particles up by hand as best you can by working all of the clumps out of the extract solids using your fingers. Depending upon how much tannin is in the extract and how much water is used the fluid can take on a light yellow to dark brown tint.

Once you are done working the extract into fine particles let the water set still undisturbed for an hour or for however long it takes for the particles of crude salvinorin which have been stirred up into the fluid to all settle to the bottom of the container and then pour the water off being careful not to let any of the solids flow out with it, add more water and stir the extract again. Keep doing this until the water no longer takes on any color and then completely dry the extract in an oven set to 125 degrees F. until no hint of moisture remains. Save all of the water used to remove tannin and check it in a few hours to see if more salvinorin has settled into the bottom of the container.

Note: This extra step to remove more of the tannin impurity by pouring in and stirring a an ounce or more of water into the extract will only work **at this point** if the extract is still moist and has not dried yet because once all of the water moisture has evaporated out of the extract the lipid fats will congeal together to form a waxy solid which will become a barrier to the water. However, if you have allowed the extract to dry there is still another point in the process where this can be done. Removing additional tannin from the extract using water can also be done after using naphtha to removed the waxy fats and chlorophyll as long as you have completely evaporated all hint of naphtha from the extract solids prior to adding water.

The majority of the extract which dries on the sides of the evaporation container can contain a substantial portion of the salvinorin extracted and if a crusty hard film which sticks to glass is without a doubt high purity salvinorin so be sure to scrape every bit of it off too. All of the waxy deposits on the evaporation container should also be scraped off and saved for step 5. if necessary using naphtha to remove these residuals from the sides of the container. It is important to remove all of the extract from the evaporation container so that it is completely clean as these films can contain a substantial portion of your yield.

5. Using naphtha to remove lipid fats and chlorophyll: Once every hint of solvent has been evaporated out and the extract is completely dry of moisture pour in four or more ounces of pure naphtha directly into the evaporation container (if already scraped out of the large evaporation container transfer all of the extract into a bowl so that you can work with it better). Completely dissolve all clumps of extract or wax into the naphtha so that only fine granules remain in the fluid. This may require crushing with a spoon while in the naphtha or working the extract between your fingers until all of the clumps are smoothed out. I like to use a small mixing bowl and a kitchen wire whisk utensil to rapidly and thoroughly mix the naphtha and waxy lumps of extract until they are completely dissolved.

Next, pour all of the naphtha and every bit of the extract into a glass jar and thoroughly mix the extract into the solvent for a couple of minutes and after mixing set it aside undisturbed for two hours or more. What you are waiting for is for the ultra-fine salvinorin particles which were stirred up in the naphtha to settle to the bottom of the glass which can take a long time for most of them to fall out of the fluid. After the salvinorin particles have settled the fluid will become translucent, if at all cloudy the particles have not all settled out yet. After the salvinorin has settled to the bottom of the glass, slowly, taking great care not to let any of the particles flow out with the fluid pour the dark green naphtha off of the solids in the bottom of the glass.

To continue washing the extract I like to work with smaller containers and recommend placing the extract solids into either a small shot glass or a 25-50 ml vial about one inch wide by two inches tall. Add more clean naphtha to the glass and mix the extract into the fluid for another couple of minutes and set aside for an hour or more before pouring off the naphtha again. Continue mixing naphtha into the extract solids and washing over and over (waiting for the particles to settle each time) until the fluid becomes a fairly light translucent green tint, at this point the naphtha has become ineffective for removing much more of the waxes and chlorophyll. Once the fluid stops taking on more color with each additional wash of the extract solids stop using naphtha. When done be sure to completely pour off every last drop of naphtha and completely dry the extract until no hint of naphtha remains.

Note: Since salvinorin is completely insoluble to naphtha but the dark waxy lipids from the leaf are fairly soluble to this solvent you don't need to worry about using too much, use as much as you like but take care to wait long enough for the ultra fine crystalline salvinorin particles to fall to the bottom of the container before pouring the fluid off. I have outlined using 25-50 ml at a time because I have found that working with smaller amounts of fluid is easier for me but larger amounts of naphtha can be used if you don't mind the extra amount of time it takes for the particles to all settle.

To check for the presence of these particles floating in the fluid shine a bright flashlight into the fluid from the top while viewing in subdued light and you should be able to see large amounts of extremely small particles of salvinorin slowly settling in the fluid, so slowly that you might not be able to see movement, but they are. Using several ounces of naphtha at a time might require waiting several hours for the majority of the salvinorin particles to settle to the bottom of the container, but when using a small one ounce glass most of them should settle in the first hour or so.

Do not use naphtha to remove fats from your extract unless you know for sure that the naphtha you are using will evaporate completely clean without leaving any amount of residue. Although, if continuing to clean the extract solids with 99% isopropyl these contaminants should be washed away I do not recommend using questionable purity. 99 percent isopropyl or 98% ethanol can be used in place of naphtha. These two Alcohols will do the job even better than naphtha but using them will remove some of the salvinorin from the extract each time you wash the solids, but no so much to be a problem if you use it sparingly enough. The solvent used to clean the solids can be evaporated and worked again to recoup the salvinorin lost to the washes, in ever diminishing returns, of course. The same with ethanol, this alcohol can be used in place of isopropyl but high proof ethanol removes more than twice as much salvinorin per ml as isopropyl and because of this, unless you want to go food grade all the way with your solvents I don't recommend it.

If you have done a good job removing most of the tannin from the initial extraction and then removed as much of the fats as you can using naphtha followed up with water washes of extract to get the rest of the remaining tannin, the amount of dried extract from a 250 gram extraction of average potency leaf should weigh close to one gram and be over 50% pure with the remaining waxy impurities. Although they might not seem to be present if your extract is a grainy dry substance, if it is still green colored the waxy lipids are still there, even if it feels completely dry without any amount of sticky tack to it. At this point the extract is quite pure enough to use for making enhanced leaf without incurring additional losses through more processing so you can stop right here if you want to have maximum yield and assume the extract is close to or above 50% pure. The extract should be checked to make sure there isn't any tannin remaining by performing the purity confirmation outlined in step 8 (below) of this document. Be sure to save all of the water used to remove tannin and check it in a few hours to see if more salvinorin has settled out of the fluid.

6.0 Making tincture - (skip this step if you are not making tincture).

Dried extract which has had the majority of the waxy lipids removed by pure naphtha is perfect for making tincture, just dissolve as much of the extract as you can into 151 to 190 or higher proof ethanol drinking alcohol of any kind while at room temperature and you will have an effective tincture, the higher the proof the more effective. In my experience, removing more of the chlorophyll and lipid compounds by continuing to wash the extract solids with 99% isopropyl will at some point make the extract too pure for making an effective tincture if using 151 proof drinking Alcohol. When making tincture from high purity salvinorin without some of the other compounds from the leaf present in it should only be done when using extremely high proof ethanol such as 98%, but even then I believe an amount of the dark compounds from the leaf somehow helps sublingual absorption of salvinorin.

If having extracted from 100 grams of dried leaf you should be able to make at least 5 to 6 ounces of 151-190 Proof ethanol tincture from that amount of extract. If you have extracted from enough leaf to make six ounces of ethanol tincture be sure to dissolve all of the extract into the drinking alcohol all at once instead of making each ounce of tincture separately, otherwise if using too much extract for the amount of Alcohol the excess salvinorin won't fully dissolve and end up in the bottom of the tincture bottle as a solid which can easily make a dose of tincture far too potent if a large portion of the fine solids are accidentally sucked up into a dosing dropper. However, there is one positive way to look at it if you find salvinorin solids in the bottom of your ethanol you can be assured that the ethanol contains as much salvinorin as can be dissolved into the alcohol but I would then pour the alcohol off of the precious solids and save them for the next batch.

Note: These are guesstimates; If using 190 Proof ethanol this alcohol probably won't hold much more than 1.0~1.2 mg of salvinorin per ml of fluid when at room temperature. High Proof 98% ethanol is reported to be able to hold close to 1.3 mg per ml of fluid. A chemist reported to me that he found that when a moderate amount of the waxy compounds from the leaf dissolved into 98% pure ethanol can hold much more salvinorin per ml. I have found when making my own tincture using 151 Proof ethanol and dissolving nearly pure salvinorin into that low of a Proof alcohol that the tincture was not at all effective without also having the dark waxy compounds from the leaf present in the tincture too. Perhaps the tincture was ineffective because I could not dissolve enough salvinorin into the 151 Proof ethanol (which is close to 25% water) or because some of the dark waxy compounds from the leaf are needed to help sublingual absorption, or both. Either way I have found to be effective some of the dark impurities were needed for tincture made from 151 Proof ethanol.

7. Further purification: To further purify your extract begin washing the solids with very small amounts of 99% isopropyl in a ratio of no more than 1/3 dried extract to 2/3 isopropyl in a small 25-50 milliliter vial or shot glass until the extract is a light green to yellow tinted or white. This is done by pouring in IPA and mixing the extract into it for a couple of minutes until the fluid becomes a dark color and then setting the small glass aside to wait for the fine crystalline salvinorin particles to settle to the bottom of the glass which can take an hour or more the first time. If having extracted from less than 100 grams of dried leaf the amount of 99% IPA used for each wash should be limited to about 25 ml per wash, if having extracted from 250 grams of leaf 50 ml per wash. Washing the extract solids with smaller amounts of isopropyl, regardless of the amount of leaf extracted will cause less of the salvinorin to be lost on a wash per wash basis but requires more washes of the extract solids. Regardless, using less fluid each time will cause the losses to be minimized and should be done this way to minimize the losses from this purification process.

During the first wash of the extract with 99% IPA the fluid will likely become so darkly colored that even after the majority of the salvinorin particles have settled to the bottom of the glass it can be very difficult to tell where the layer of fluid ends and solids start in the bottom of the glass. Because of this remove no more than half of the volume of fluid before adding more isopropyl. This can be done by either using an eye dropper to remove the fluid from the top (don't dip too deep), or by carefully pouring half of the fluid out of the glass while closely watching under a strong light (without UV) to make sure none of the solids start to flow out with the fluid. When pouring the isopropyl off you probably won't be able to get the last third or more of the fluid out without also pouring some of the solids off too. Just leave that last third of the fluid in the glass and add more isopropyl to it because it will eventually dilute out anyway. Using an eye dropper to remove the fluid on top of the solids is my preferred method to reduce losses but is much slower than pouring.

Continue washing the extract by adding more IPA, stirring and letting the glass sit still long enough for the majority of the salvinorin particles to settle out of the fluid in cycles of removing the fluid and adding more until the solids which settle to the bottom of the glass are as light colored as you desire, the lighter the color the higher purity the extract will be. As the salvinorin becomes cleaner with each wash of the solids, the micron sized crystalline particles of salvinorin will take longer and longer to settle out of the fluid, when approaching high purity taking as long as three hours or more to completely settle after each wash when using a single one ounce glass, longer for larger capacity containers due to the increased amount of fluid. Don't pour the fluid off of the cleaned salvinorin in the bottom of the glass if the fluid has a cloudy look because this means that you still have lots of fine salvinorin particles floating or suspended in the fluid and you should wait for however long it takes for them to settle before removing the solvent. You can continue washing the extract until it is a light green color or all the way to white if you like, however this will increase your losses, up to 25% going as high as 50% if you don't wait long enough for all of the fine particles to settle.

Cleaning the solids to a white color isn't necessary because once the solids are a very light green tint (as long as all of the tannin has been removed too) the extract is a high enough purity to consider it over 90% pure for use to enhance leaf, just use 10-15% more extract when lightly colored to make up for being less than completely pure. Be sure to save all of your isopropyl from the first wash plus as it can contain a quarter or more of your salvinorin, depending upon how much was used, how far you cleaned the extract and whether you waited for all of the salvinorin particles to settle before pouring off. If having extracted from 100-250 grams of leaf, use no more than 25 ml of 99% isopropyl per wash. You can use half of this amount of fluid per wash, just don't use more. If extracting from one ounce of leaf (28 grams) no more than 8-10 ml per wash. Although salvinorin is weakly soluble to room temperature 99% isopropyl take great care to use as little as possible or you will loose too much salvinorin with each wash to the point of removing most of your yield if too much is used.

Note: Small amounts of 99% isopropyl can hold far more lipid fats and chlorophyll impurities than it can hold salvinorin on a milliliter basis and due to this when the extract is washed through several times with a few milliliters of this solvent more and more of the green is removed while the bulk of the salvinorin will remain behind. When waiting for the salvinorin particles to settle to the bottom of the glass about half of the salvinorin will fall out of the fluid in just 20 minutes because they are relatively large particles but the smaller and nearly impossible to distinguish particulates of salvinorin will continue to fall out of the fluid for three hours or more, although 80-90% of them will have settled in the first hour.

To prevent large losses of your yield to the isopropyl washes of the extract you must wait for all of the extra fine salvinorin particulates to fall out of the solvent, waiting for the fluid to become completely clear is VERY important. Understand I do not mean colorless, the isopropyl can be from very dark shades of green to light yellow or all the way to white, but never cloudy before you remove the fluid or you will lose a significant portion of your yield. To see if the fluid is cloudy or not hold it up to a bright light, if you can't see through the fluid like looking through dark to lightly stained glass then salvinorin particles are blocking the light.

8. Purity confirmation: Once your extract has been cleaned to the color desired and completely dry and free of any other solvent, you can check to make sure it does not contain fine sediments from the plant which can easily be colored white by the salvinorin or when in large quantity will cause the extract to have a gray appearance instead of white. These ultra fine impurities can be removed by filtering with papers in a buchner funnel or by dissolving all of your extract into 100 ml of room temperature to warm acetone. If after stirring the fluid for a couple of minutes it does not become a clear color wait 12 or more hours to see if the fine sediments fall to the bottom of the glass. You don't need to worry about trying to dissolve too much salvinorin in 100 ml of acetone from a 250 gram extraction of leaf because that amount of acetone should easily hold close to four times the amount of salvinorin in the dissolved when at room temperature.

If the fluid appears at all cloudy after dissolving salvinorin into it this means that either you didn't dissolve the salvinorin into the fluid thoroughly enough, or there is lots of fine particles or sediments present. Unless these fine particles are present and stirred up into the acetone it should be clear, it can be colored from a light yellow to a dark green tint if you didn't remove all of the dark green compounds but never cloudy before you pour the fluid off or something is wrong. If after 12 hours the acetone is still cloudy continue to wait, the tannin will fall out of the fluid eventually, taking as long as 24 hours. When you are ready to pour the acetone out for evaporation to net your tannin free salvinorin extract don't try to get the last few milliliters of fluid out of the glass because some of the tannin will come along with them, better to add more acetone and shake it up to dilute what ever remaining salvinorin there might be in the remaining fluid or mixed into the sediments than to try to pour out every last drop of fluid. Of course, you will have to wait for these impurities to settle out again.

Here is a standardization procedure so that you can add salvinorin back to leaf. This came from a well known Salvia divinorum researcher explaining how to make 6X enhanced leaf:

The method is simple: Dissolve a measured quantity of salvinorin A in a solvent, and then absorb it onto a measured quantity of crumbled salvia leaves. Evaporate off the solvent, and Wha-la! Here is a more detailed explanation: To make salvinorin A enhanced leaf that contains 15 mg salvinorin A per gram of leaf, dissolve 12.5 mg* pure salvinorin A in 1 ml of warm acetone, and then add 1 gram of crumbled salvia leaves and stir. The leaves will absorb the salvinorin A-containing acetone. Place the container in a well-ventilated location and wait for the acetone to evaporate off. Stir the leaves occasionally during the evaporation period. Make sure that the acetone has evaporated completely--there should be absolutely no smell of acetone left on the leaves.

* The amount of salvinorin A to use will vary depending on the salvinorin A content of the leaves that it is being absorbed onto. If the leaves are of average potency, containing 2.5 mg salvinorin A per gram, then you would deposit 12.5 mg salvinorin A onto them to bring the concentration to 15 mg per gram (as in the above example). Of course, one can standardize the leaves to other concentrations as well. The more precisely you know the salvinorin A content of the leaves, the more accurately you can standardize them. I use very pure salvinorin A for this procedure. If you are using material that is impure, you will need to take into consideration the percentage of impurities when calculating the amount of material to use. Obviously, the same technique can be used to deposit salvinorin A onto other types of leaf.

I strongly advise against smoking leaf that contains more than 15 mg salvinorin A per gram unless the individual doses can be accurately weighed. At this concentration, the amount of smoke produced provides a certain amount of safety because it makes it difficult for a person to accidentally inhale too large a dose in a single inhalation. If you have a precision balance that can accurately weigh small doses, then stronger concentrations are preferable since the amount of smoke can be minimized without compromising safety.

Note: acetone is the best solvent to use for enhancing leaf because so little fluid is required to completely dissolve relatively large amounts of salvinorin, and evaporates fairly rapidly compared to Alcohol.

Is there a way to make a less harsh smoking enhanced Salvia divinorum leaf?

Yes, although this might actually make the leaf too easy to smoke. I have found that Salvia divinorum leaf is much easier to smoke when most of the chlorophyll and tannin has been removed from it. Here is how I make my own high quality standardized Salvia divinorum leaf:

The first thing I do is hand select Salvia divinorum leaf for quality, setting aside the stiff dark to almost black colored leaf in favor of the lighter colored soft green leaves. Once I have my pile of leaf to be made into incense I carefully hand de-vein the stem running through the center of each leaf being careful to keep the leaf in as few pieces as possible. When I have a full bowl of de-stemmed and de-veined broken leaf I then extract the leaf with a room temperature solvent such as acetone or 99% isopropyl several times to remove the salvinorin which is set aside for later processing. Because of the extra work required selecting the best leaf and de-veining them this process isn't meant to obtain salvinorin, but rather to condition the leaf to ready it for salvinorin enhancement.

Next, I take the spent leaf, having already had the salvinorin removed from it and re-extract the leaf but this time instead of trying to get the salvinorin out the extraction is for removing as much of the dark waxy compounds from the leaf possible. Once you are done pour every bit of the solvent off of the leaf and let it completely dry without a hint of solvent smell in the leaf and then boil all of the leaf together in a pot of hot water for a half hour or more, once the water turns brown pour it off and add more water to boil the leaf again. Keep doing this over and over until the water will no longer take on a brown color. When done pour all of the water off of the leaf and spread it out on a cookie sheet and dry in an oven set to between 125 degrees F. for however long it takes to completely dry, usually several hours in a convection oven. After the leaf is completely dry you can use it to make your own standardized enhanced leaf at what ever X factor you desire. When *Salvia divinorum* leaf is conditioned this way by removing most of the chlorophyll and tannin first the leaf will then readily absorb salvinorin dissolved into acetone when making standardized leaf.

If you have finely crushed leaf instead of large pieces you can process the leaf just the same, but I like to keep the leaf in as large and few pieces as possible because when drying in an oven they will shrink quite a bit. Also, I believe that large pieces of enhanced leaf are better than smaller pieces because it provides far more options for how it can be burned. The only thing is, when you have such nice big pieces of enhanced leaf you won't want to package it in small plastic bags which can easily allow the leaf to be crushed or broken further.

Notes on solvents used for extracting and refining salvinorin

The use of any hardware or non-reagent grade solvents to extract or refine salvinorin is not up to the strict standards required for any kind of human consumable. If you use them do so at your own risk. I am not a chemist and am not qualified to give advice in regard to the safe use of solvents or their suitability for use to make any kind human consumable including enhanced leaf or any other kind of *Salvia divinorum* materials which might be smoked, chewed or consumed in any way. That being said, here are my own perspectives on using hardware store solvents:

Can 90% IPA/isopropyl be used in place of 99% isopropyl which is much harder to find?

I have never tried it myself I don't really know but have seen one report that 90% IPA worked for someone but at what efficiency? If you do use it I would extend the amount of time extracting the leaf to at least 10 minutes and make sure to do the extraction to the same leaf at least four times over. Although off the shelf isopropyl isn't a reagent it is considered medical grade which to me means that it is very clean.

I have been able to find 99% isopropyl on the shelf at many large grocery stores right next to the 70%. High purity/percentage isopropanol is used for many things which include telecommunication fiber optics, fiberglass kits and for gun cleaning. If you want to find various suppliers just do an image search on google under the term "99% Isopropyl" and you should get many links to suppliers. See this abbreviated link for a google search to suppliers of 99 percent IPA: <http://www.tinyurl.com/zpg67>

Can inexpensive off the shelf solvents be used to make enhanced leaf?

If I were making *Salvia* for sale to the public I wouldn't use anything but medical grade 99 percent isopropyl (rubbing alcohol) or reagent grade acetone which has a guaranteed purity to extract and refine leaf, but if extracting leaf for my own use alone with the full knowledge that it does not meet the strict standards required for human consumables I am not concerned that I will be poisoning myself with residues from the solvent as long as I have first tested the solvent to make sure that there aren't residues remaining after evaporation. I have found that some brands of hardware store acetone leave very little residue after evaporation. (Which can be removed, see below).

Before I use any kind of solvent for *Salvia* extractions or refinement of the extract I first check each batch of solvent by evaporating a full cup of it in a glass bowl to see if it leaves any residue. I have found that most hardware store acetone only leaves a slight white watermark looking residue in the bottom of the glass, very slight and may be difficult to see unless you look closely but smudges like a very light oil. What ever you do, avoid acetone which has benzene additives, usually labeled "Extra-strength" acetone and don't evaporate solvents in closed areas!

What might be in a light residue left behind after evaporation of hardware store acetone?

I asked a chemist what these remains were and he told me that they were simple polymers, things like you find in chicken grease etc. and that the manufacturing process for acetone does not produce heavy metals so he wasn't concerned about it. Still I don't want any amount of residue from off the shelf solvents in the extract I make so as a last step I always clean the extract with medical grade isopropanol to remove them by cleaning the extract solids with two or three washes with small amounts of 99% IPA/isopropyl/isopropanol.

(Continued below)

Where can I get 99% isopropyl AKA isopropanol?

Many individuals have reported having trouble finding 99 percent isopropanol for use to de-fat or clean extract. I have heard that 90 percent isopropanol does the trick well enough for cleaning the extract of waxes but I wouldn't use it for extracting leaf because I have found that 70 percent IPA is useless for extracting salvinorin making me wary of anything less than 99 percent isopropyl.

One source of high purity isopropanol which might be suitable are those little red bottles used to remove water from gasoline with the brand name of iso-heat which have been reported to be 99 percent isopropanol but I'd be sure to evaporate a bottle of it first to see if it leaves any amount of residue behind. If you want to find an inexpensive source of acetone for extracting leaf I have found the Klean-strip brand of acetone found at Walmart and many other stores in the 3.8 liter can to be very clean and useable for Salvia extractions if the dried extract solids are then thoroughly cleaned to a white purity using medical grade 99% isopropanol/isopropyl.

Where can I find clean naphtha?

The VM&P Naphtha Klean-strip sells is much cleaner than any kind of camp stove fuel which always have an oily rust inhibitor in them. At one point I had always used naphtha to remove the waxy impurities from leaf but these days (2006) I don't think using naphtha is really all that necessary if you are going to clean the extract with IPA anyway. One individual told me that xylene is more effective at removing the waxy lipids and impurities from extract than naphtha so that might be worth a shot if you can get it. See all three of these solvents advertised at the following link: <http://www.tinyurl.com/cbtzy>

If you use any of these hardware solvents to extract leaf or refine extract I highly recommend using 99 percent isopropanol as a last step to clean the extract to remove the slight amount of residue which might be left behind by them. Be sure to do an evaporation test with each of them to see for yourself how clean they are before using them to work with leaf.

Naphtha is hexanes, you can buy hexane in a bottle sold for rubber cement thinner at art supply stores and use it instead. Naphtha is just light petroleum spirits. Coleman lantern and camp stove fuel is naphtha but has rust inhibitor oil added to it, so I wouldn't use that.

Klean-strip VM&P Naphtha is about as clean as I can find. The thing is, if you are cleaning the waxy lipids and dark impurities from salvia extract using naphtha it is all poured off anyway, so you only really have a few ml of the stuff drying into the extract. Not enough to cause a problem, especially after full evaporation. If benzene is in your solvent I doubt any detectable amount of it will be left behind as it evaporates away too.

It is easy to check to see if your source of naphtha AKA shellite has residuals which will be left behind, evaporate an ounce of it and see what is left. You will have far less than that in the wetted extract, once the naphtha is poured away. I have doubts you will notice any residues from most sources of naphtha from that small an amount of solvent.

If you then wash the extract with some 99 percent isopropyl what ever the naphtha might have left in the extract is washed away by that, something which is medical grade and leaves no residue!

If you want to skip using naphtha all together do so! Any more I only use naphtha for cleaning the extract from a room temperature extraction. Use zero degree F. chilled acetone to extract your leaf instead and you don't have to use naphtha at all. See the "making cigarette papers" .pdf document at <http://www.imageevent.com/sphere>

(Continued below)

Refinement Q and A's

Q: I have been wondering about IPA washes to remove impurities, and have a few misconceptions. First why does the salvinorin fall to the bottom of the IPA, is it because there is not enough capacity in the IPA for the salvinorin and therefore it becomes concentrated at the bottom instead of dissolving right?

A: Yes, 99% isopropyl can only hold a certain amount of salvinorin in the fully dissolved state, the rest remains as a solid.

Q: I'm thinking if salvinorin falls to the bottom IPA does that mean it falls to the bottom of the naphtha simply because it is being repelled?

A: The reason the crude salvinorin extract falls to the bottom of the naphtha is because of gravity, nothing more. Salvinorin is insoluble to this solvent so it has no where else to go but it takes awhile for the lighter particles to all fall to the bottom.

Q: The way I understand this, the salvinorin should be equally distributed throughout the solution used to remove impurities, why does it end up as a solid in the bottom of the glass?

A: If you have dissolved salvinorin into 99 percent isopropyl/IPA it will only hold close to 1 mg per ml of fluid when at 27 degrees C., perhaps more if other compounds from the leaf are present. Acetone will hold close to 23 mg per ml when at 27 degrees C. otherwise, if more salvinorin is in the solvent than it can dissolve it ends up as a solid in the bottom of the container.

Q: When the crude extract or salvinorin falls to the bottom of a container of water or naphtha why does it do that for those two and not for acetone? Also, why do the tannin sediments also fall to the bottom?

A: High purity salvinorin is insoluble to water, having no where to go it falls to the bottom as it does in naphtha because salvinorin is also insoluble to it. The reason the salvinorin falls to the bottom is just due to the force of gravity. The fine sediments in the solvent from an extraction will also fall to the bottom of a container after a period of time due to gravity because it is not soluble to pure isopropyl or acetone either, unless there is an amount of water in the solvent which will hold it.

The only reason salvinorin solids don't fall to the bottom of a volume of acetone is because salvinorin is extremely soluble to acetone, holding over 20 mg per ml of fluid. Unless you have a huge amount of salvinorin it all dissolves into the acetone. If you add 5 grams of near pure salvinorin to 100 ml of acetone you will have the same thing happen, the amount of salvinorin which won't dissolve into it will fall to the bottom of the container, the same as with 99% isopropyl. If working with large enough batches of extract acetone can be used this way and is even more effective at removing or washing out the waxy impurities than 99% isopropyl.

Q: If you were to dissolve salvinorin in enough IPA that there is plenty of capacity would the salvinorin fall to the bottom?

A: Nope, if there is enough IPA to hold all of the salvinorin in the dissolved state, of course there will be none in the bottom of the container.

Q: Is crucial that you remove all of the sediment before trying to wash the remaining impurities with IPA since any sediment would fall with it.

A: No, you can wash the crude extract with 99% isopropyl/IPA if there are fine impurities from the leaf still present in the extract and remove the last of it doing what I call the purity confirmation step but I don't recommend it because if you are using the color of the extract solids as an indicator of purity to gage how many washes are done to the extract at some point, if the extract is washed too much, it will begin to turn a sandy brown color as you wash out the last of the salvinorin from these fine sediments which will remain. If these fine particles are present in the extract it is possible to wash half of the salvinorin out of the solids and it will still have a white appearance, half salvinorin and half fine sediments. Because of this I always try to remove all of them first before attempting to further purify the extract using 99% isopropyl.

Q: What impurities does IPA remove opposed to naphtha?

A: I don't have the proper lab equipment to define the difference other than to say that IPA will more effectively remove the more stubborn dark impurities from crude salvinorin extract compared to naphtha. I use naphtha first because salvinorin is insoluble to naphtha and except for particulates will not carry away the salvinorin. After using naphtha I then move on to using isopropyl to get the last of the impurities out of the salvinorin extract that naphtha cannot get to very easily.

You could just wash the extract with 99% isopropyl and skip the naphtha washes. In fact, you only need one solvent to both extract and refine salvinorin leaving naphtha out all together. It's just a matter of preference for me that I use naphtha, you don't have to. You could both extract and refine salvinorin using just isopropyl or even acetone, as long as you have extracted a large enough batch of leaf so that the acetone can't hold all of the salvinorin in the fully dissolved state when you are washing the extract solids but the losses are much higher when using acetone to clean or wash extract because it can hold so many mg of salvinorin per ml of fluid compared to isopropyl.

Solvent solubility:

Solubility figures provided to me by a chemist who did the work in exchange for Salvia leaf. The data for the following table was collected using 15 grams of solvent for each gram of salvia leaf. Each involved a 16 hour soak at approximately 27 degrees C. All weights given are in gram units.

Salv. A, mg/ml @ 27C +/- 10% Solvent	starting weight of leaf	salvinorin extracted	ratio of leaf to salvinorin extracted
acetonitrile	.6	.12	.2
isopropyl alcohol 91%	4	.18	.045
acetone	2.7	.19	.07
ethyl acetate	2.8	.13	.046
dichloromethane (DCM)	3.3	.16	.048

Acetone and isopropyl alcohol are at least as useful solvents as other more difficult to acquire chemicals. Acetone is significantly more effective than isopropyl or ethanol. Acetonitrile is very effective, but extremely toxic and far more difficult to acquire.

Salvinorin A solubility's, mg/ml @ 27C +/- 10%

solvent	capacity	comment
acetone	~23	best solvent choice identified thus far
methyl alcohol	3.15	ie. methanol
ethyl alcohol	1.28	Reported elsewhere to be 1.8
isopropyl alcohol	~0.74	this low carrying capacity indicates that this might be better used for cleaning the crystals rather than as an extraction solvent
cold water	negligible	keep in mind that as water warms, it carries significantly more salvinorin

(Continued below)

Cleaning up your extract: *(From my original tech Dec. 2001)*

When extracting leaf with room temperature or warmer solvents the extract can be further cleaned or refined by using just naphtha, or Ronsinol lighter fluid. Naphtha is superior to any other solvent when used to clean up an extract from this process because salvinorin is almost insoluble to naphtha (compared to other solvents) and the green or non-salvinorin portion of the extract is extremely soluble to naphtha. When using naphtha to wash the extract solids from a chilled acetone extraction to crushed leaf naphtha clean up can yield some very white salvinorin from just one wash of the extract. (When doing very short extractions with zero degree F. chilled acetone for under three minutes a follow up cleaning step such as this is generally not needed in order to achieve crystalline salvinorin.)

When I did my first extraction using this method with 200g of leaf, I had let the extract completely dry and then put all of my dry crusty crystalline extract into about 30 ml of reagent grade methanol. Immediately, the methanol took on a dark green color and I could see crude salvinorin that contained lots of small crystals fall to the bottom of the container. Because of this, it was obvious that I had some highly purified extract to begin with. Although methanol will work fine to remove the green, I should have used naphtha instead of methanol because salvinorin is far less soluble to naphtha. This way, I loose less of the salvinorin to the solvent when I later pour it off from the salvinorin concentrate laying in the bottom of the container.

Naphtha is also used in a process called partitioning (washing). It is used to clean up extremely impure extracts that contains so much chlorophyll that the extract appears to be made of black wax. This is the kind of extract that you will get if you try to extract from powdered leaf for more than just a few seconds with either acetone or isopropyl. You can also get it if you soak whole leaf in either of these solvents at either room temperature, or for too long a period of time. If you were to use the partition process to clean up a *Salvia divinorum* extraction, you would first completely dry your extract out and then reconstitute it with 100% methanol. Then, after completely dissolving your extract in it, you would mix the methanol with an amount of water that would add 20% to its total volume (80% methanol, 20% water). This is then mixed with an equal volume of naphtha inside of a glass container called a separatory funnel. A separatory funnel is just a cone shaped sealable glass container that has a drain valve on the bottom. The partitioning process is used to remove an undesired component of one solvent by transferring it into the other. The whole sep funnel with its two layers of solvent is agitated, or shaken, to get the two solvents to temporarily mix together, something that they normally won't do. The solvents will separate into two distinct layers again, which could take several hours, days, or longer. The bottom layer of solvent is then removed and saved by opening the valve in the bottom of the container. The lower layer of fluid is the one you want to keep. After evaporating all of the methanol and you should have a much nicer extract, at a cost, since you will loose some of the salvinorin to the naphtha.

If you have partitioned your extract, the larger portion of the lost salvinorin can be recovered out of naphtha by doing a process called "back washing" the (green) Naphtha with a fresh mixture of methanol/water, added right back to the Naphtha in the separatory funnel (After the Methanol w/salvinorin has been drained off). For those of you who haven't guessed, when naphtha and methanol/water are mixed together in a separatory funnel, the naphtha floats on top of the methanol. Adding water to the methanol increases the polarity of the methanol, making it immiscible with naphtha, otherwise they will mix. If you were to try to add straight methanol and naphtha together, they would readily mix and no partition between the solvents will occur.

Cleaning up your dry extract using methanol or isopropyl:

Methanol can be used to clean up extractions directly (as opposed to cleaning them with naphtha, then cleaning the naphtha with methanol), but some of salvinorin is lost to the methanol because methanol will hold at least 3.15 mg per ml. Plain old 99% isopropyl (Isopropyl) can also be used for cleaning up an extract and would be better than methanol because it will saturate with about one fourth the amount of salvinorin per ml. Acetone would be the worst solvent to use for cleaning it up, it can hold at least 23 mg of salvinorin per ml. Keep in mind that you can't easily clean up the extract when using the quick whole leaf extraction process unless you first separate off the sand-like layer of super fine particles of plant material that you will also remove from the leaf along with the salvinorin. Also, even using the two step process (When combining all of the acetone together) you may get plenty of green, but it won't be so much that looks black. Aged leaf that is six or more months old (the longer, the better) seems to be much better for this use, as it seems to extract out much less chlorophyll when using this quick process. A traditional 'cure' designed to destroy chlorophyll in smoking materials may also help with obtaining a cleaner extract.

Crystallization Notes:

One of the tricks that people use to grow crystals is to warm Methanol up and then adding crude salvinorin to it until I will no longer completely dissolve the solids. Because Methanol will hold much more salvinorin when it is warm then when it is at room temperature, the crystals slowly start to form as the liquid cools. In some circumstances salvinorin will just drop out of the fluid in a crude form, without crystallizing. Sometimes you need to seed the fluid with a crystal from a previous extraction, this can kick things off. Even so, I have seen salvinorin just drop out of the fluid as a non-crystal substance, even as white or light-green flakes. It can look like small sandy particles, flakes, a fine sludge, or crystals. It may be greenish, grayish, white or translucent with a yellowish green tint, depending on the type and quantity of impurities.

One of the most pronounced things about salvinorin in solvent such as isopropyl, ethanol, or methanol is that it loves to stick to glass. In crude form, it will usually stick to the glass, but can be easily swished away by jiggling the solvent in the glass around. When I cleaned up my last quick acetone extraction by pouring the dry extract into methanol, the salvinorin that fell out into the bottom of the small 50 ml glass container was almost all crystalline, mostly greenish translucent crystals, but the crystals didn't stick to the glass at all, until I poured all of the methanol out, then they just all stuck together to form a greenish gray sludge because they had not dried. They didn't look like crystals at all after I removed the methanol. One of the methods used to keep crystals from adhering together is to pour out the methanol, or what ever you used to grow them in, and then pour in a small amount of naphtha to keep the crystals from sticking together. Then, you can more easily separate the individual crystals for drying, since naphtha doesn't like to hold salvinorin, it will just evaporate off without dissolving your crystals away.

Making tincture

If reconstituting extracted salvinorin A into drinking alcohol keep in mind that ethyl alcohol holds only 1.8 mg of salvinorin A per ml. For comparison's sake, Daniel Siebert's tincture is said to contain about 1.36 mg of Salvinorin A per ml. It might be useful to aim for 1.4 mg per ml, and then dilute this to 50% alcohol in an aqueous solution. This will allow fairly rapid absorption without the tissue damage that can be caused by liquors such as Everclear® which comes in both 151 and 190 proof. Keep in mind that 190 Proof is ~95% pure alcohol, 151 Proof 75% and 80 Proof 40% alcohol with water which is the most common, and 80 Proof vodka is the easiest, cheapest source of drinkable ethanol for most persons.

As ethanol alcohol holds 1.4 mg salvinorin per ml, and water holds practically none, and a ml of 80 proof vodka holds only 40% ethanol, one might presume 1 ml of 80 proof vodka would hold .56 mg of salvinorin. An ethanol / water mix is likely to have different solubility characteristics than the average of water and alcohol though. Refer back to how adding 20% water to methanol suddenly made that substance immiscible with naphtha. It should be easy to take pure salvinorin crystals and calculate how much dissolves per ml, then aim for 50% of that (to prevent spontaneous crystallization in the solvent).

General Notes: There are many possible variations which could be used to extract *Salvia* leaf and refine salvinorin. You could skip the waiting period for the fine sediments to fall out by special filtering, or cycles of filtering. Also, you can go ahead and evaporate the acetone or what ever solvent you have used to extract the leaf all the way down without waiting for the fine particles to settle and then after the naphtha washes dry the extract then do the water washes to remove tannin impurities and then use the purity confirmation step to remove the last of the fine sediments.

You could extract the leaf with 99% isopropyl and then evaporate it all out and while still moist with water add a few more ounces of water to wash out the tannin and then once dry clean the last of the waxy compounds out with 99% isopropyl and skip using naphtha all together too. However, I would be sure to remove the fine sediments at some point in the process because they making refining the extract much more difficult. The method of evaporating the extraction solvent most of the way down before removing the fine sediments will work but since I always use a fan to speed the evaporation of the solvent ripples in the fluid tend to stir the tannin back up so I can't do it that way unless I wait another period of time after reducing the fluid volume via evaporation before I can pour the fluid off of the tannin in the bottom.

For acetone extractions I like to use enough solvent so that it completely covers the leaf extracted and when using 98% ethanol or 99% IPA at least two thirds or more times of but when increasing the amount of fluid this allows the leaf to be easily and thoroughly mixed within the solvent when stirring. The amount of time the leaf is soaked in either solvent can be extended for as long as you wish, this will only help increase the extraction efficiency, however I have found that when extracting *Salvia divinorum* leaf three times over for five minutes each time with 99% isopropyl that it won't get all of the salvinorin out, usually leaving 10% the salvinorin behind which requires an additional long term soaking of the leaf to get the last of it out.

When using acetone to extract leaf I have found that it will remove the salvinorin so efficiently that when re-extracting the leaf a fourth time over to check and see if any was left behind I have not been able to get enough additional salvinorin to be able to tell. If using isopropyl I do not recommend using anything less than 99% for this quick extraction method as IPA with large amounts of will increase the amount of time required to efficiently extract the salvinorin. 91% to 94% IPA might work for short extractions, but I haven't tried it to know but I can tell you that I have tried 70% IPA several times and found that with 30% water in it I found it to be useless for a quick extractions, only able to extract a waxy compound and tannin out of the leaf in the short amount of time I have outlined in this extraction tech.

This extraction process has three separate steps incorporated into it to remove both tannin impurities and the fine sediments which are also removed from the leaf. Waiting for the fine sediments to fall out of the fluid or filtering with paper will get most of it but so far, I have found it very difficult to get all of these impurities out of the extract just through settling. Waiting up to 24 hours for the sediments to fall out of the solvent is better than 12 but you can limit the amount of time the fluid is allowed to clear and then remove the last of the fine plant sediments as a last step by dissolving all of the extract into 100 ml of acetone (from 250 a gram extraction to dried leaf or less).

Be sure to keep extraction solvents in complete darkness the whole time while waiting for them to fall out because if the solvent is left out in bright sunshine you can loose a large portion of your yield due to the interaction of strong ultra-violet light while in solvent. These fine sediments are a big problem, almost everyone has the same problem with them the first few times they try this extraction technique ending up with far more of it in their extract than they believed possible thinking that all of it must have certainly settled out of the fluid when waiting as many as 24 hours for it to come out of the fluid, but even after waiting a full 24 hours these fine particles of plant material are still in there to some extent. In addition to the fine sediments, if using 99% isopropyl to extract leaf an amount of tannin impurity will also be in the extraction fluid.

To deal with this common problem I have worked an additional step into the process to wash out tannin that remains in the extract after cleaning with naphtha (drying first) using water and then one more step to remove what ever amount of fine sediments which might remain at the end of the process by dissolving the cleaned extract into acetone again and waiting 12-24 hours to see if more drops out of the fluid because at that point regardless of your best efforts you will likely still have some of it in the extract. Be careful not to touch your face or other sensitive areas of skin when working with *Salvia divinorum* wetted by solvent or when having residues from the extract on your hands. Something in the leaf can cause an allergic reaction and extreme drying of the skin which I believe is caused by the tannin in the leaf which is a very strong astringent which causes sensitive areas of skin to become reddened along with an amount of swelling and later flaking of skin which can last several days. I have never had a problem with the skin on my hands or arms but my face always has this reaction if I scratch my nose or rub my eyes when slight amounts of extraction residues or are present on my fingers this happens every time.

The reason I use naphtha to remove the chlorophyll and other waxy lipids from extract first before switching to isopropyl is because salvinorin isn't soluble to naphtha but the dark waxy compounds are. Unfortunately, after a few washes of the extract with naphtha it becomes ineffective for removing the last of the lipid and chlorophyll impurities requiring the use of another solvent such as 99 isopropyl to get the last of it. Although 99% isopropyl does an excellent job of removing the remaining dark waxy substances from the extract this solvent removes at least three quarters of a milligram of the salvinorin per ml of fluid when at 20 degrees C., more when IPA is warmer, less when cooler (more if you don't wait long enough for the salvinorin particles to settle). Also, the solubility of salvinorin has been reported by an experimenter to be much higher in 99% IPA when large amounts of other compounds from the leaf are present which can result in a significant portion of your yield being removed with each wash of your extract if you use too much, so use it very sparingly.

You can recover a large portion of the salvinorin lost to the isopropyl washes by completely evaporating the solvent and removing the dark lipid waxes using the same process over again with naphtha and IPA in much smaller amounts. Save all of your naphtha used for the washes because although salvinorin is insoluble to naphtha there are usually extremely small particles of salvinorin in the fluid which take much longer than an hour fall out of the fluid and can be found in the bottom of the container after 12 hours or more netting another 10% of salvinorin. Save all of the IPA used to wash your extract because it can be evaporated onto leaf to make 5X enhanced leaf or after evaporation reconstituted into drinking alcohol to make tincture, depending on how much salvinorin was removed through the washes. Be sure to scrape every bit of film from the sides of your evaporation container because high purity salvinorin films stick to the surfaces of evaporation containers whether stainless steel, ceramic or glass. This is one way to know you have salvinorin, because it sticks to these surfaces so well.

To see photographs of a room temperature 99% IPA extraction of *Salvia divinorum* leaf and chlorophyll being removed from extract using naphtha and 99% isopropyl go to: http://www.erowid.org/plants/salvia/salvia_extraction4.shtml