



**NEUROMODULATION TECHNIQUE
THE FEINBERG METHOD**
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Liposomal nutritional preparations to restore proper cellular regulation and to prevent or to improve outcomes in autoimmune, cancer, GI, diabetes, and other degenerative conditions

Four months of experience and experimentation with these liposomal products has led me to my current recipe recommendations. I think we have it now. You should be able to produce very consistent and effective liposomal products by following these recipes and instructions.

1. Assemble ingredients and equipment in a cleared workspace.
2. Use surgical gloves to avoid a mess with the curcumin.
3. Weigh out the wet and dry ingredients for the liposomal product you want to make. If ice is used to achieve the material temperature to 60F to begin blending, put it in the water and weigh them together. Pictures that follow show about how much ice was used. Room temperature, particular blender, and other variables may influence how much ice to use to get the desired temperature. Experience gives a feel for that. If not enough ice was used to keep below the maximum recommended temperature range of 80F-85F (27C-30C), then just put the blender container in the refrigerator or freezer for perhaps an hour and finish the remaining blending time after it chills.
4. Put the wide mouth funnel in the blender cover hole. Add the wet ingredients to the blender, place cover on blender container, and start blending at the SLOWEST speed.
5. Add the lecithin granules and blend for 5 minutes.
6. Continue to blend at SLOWEST speed and add the remaining weighed dry ingredients. The curcumin extract, resveratrol, PQQ, and piperine product will require some careful use of a silicon rubber spatula to guide the dry ingredients into the stream of moving liquid lower in the container. Avoid touching the blades with the spatula.
7. Continue blending for 30 minutes total blend time – ALWAYS AT THE SLOWEST SPEED.
8. Transfer the material into jars. I found some 16 oz BPA-free plastic water bottles with 1 1/2" opening and a toggle open/close spout at a Dollar Store for \$1.00 each. Really convenient to dose, store, and travel without worry of a spill. You can use 1 pint or 1 quart wide mouth Mason jars if you don't want to store in plastic.
9. There are a couple of recipes here. Decide what you want to make and select one set of wet and one set of dry ingredients to make that.
10. Pick a set of wet ingredients and dry ingredients for the liposomal product you want, either liposomal vitamin C/glutathione reduced or curcumin extract, resveratrol, PQQ, and piperine. Wet ingredient equivalents are given for different choices of alcohol source. Pick one. The amount of wet and dry ingredients specified will produce about 14 ounces of product.



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11. Batches can be made proportionately larger or smaller if needed.
12. Follow the instructions and illustrations carefully and you should have a nice product with minimal fuss and mess.
13. Wet ingredients: pick one set.
 - a. If using 95% ethanol: 57 grams of alcohol, 250 grams of water/ice
 - b. If using 80 proof (40%), e.g., vodka: 140 grams vodka, 155 grams of water/ice
 - c. If using 70 proof (35%) spirits: 150 grams spirits, 115 grams of water/ice
14. Dry ingredients: pick one set.
 - a. To make liposomal vitamin C and glutathione reduced:
 - i. Sodium ascorbate: 80 grams to produce about 6 grams vitamin C per ounce of liposomal product.
 - ii. Glutathione-reduced powder: 21 grams to produce about 1.5 grams per ounce of liposomal product, OR 14 grams to produce about 1.0 grams per ounce of liposomal product, OR 7 grams to produce about 0.5 grams per ounce of liposomal product.
 - iii. Lecithin 102 grams.
 - iv. The amount of glutathione reduced you use will be determined by how much vitamin C you intend to take per day. This recipe contains the maximum concentration of vitamin C that can be put in this volume of product, by design so that large volumes of product don't have to be consumed. So, decide how much vitamin C you want to take per day and then adjust the amount of glutathione-reduced you use accordingly so that you get your intended cumulative daily dose of glutathione-reduced in that much vitamin C.
 - b. To make curcumin extract, resveratrol, PQQ, piperine product that contains
 - i. 95% curcumin extract powder 140 gm
 - ii. Resveratrol 28 gm
 - iii. Lecithin 102 gm
 - iv. Piperine 7 gm,
 - v. PQQ (Pyrroloquinoline Quinone) 560 milligrams.
 - vi. One ounce of product contains 95% curcumin extract powder 10 grams, resveratrol 2 g, lecithin 7.25 grams, piperine 0.5 g, PQQ (Pyrroloquinoline Quinone) 40 milligrams.
 - vii. Adjust the ratio of resveratrol if desired for some reason, but I recommend making this high concentration product as your stock



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product and just adjust the daily ounce dosage to achieve the intake that is desired.

viii. The purpose of PQQ and piperine are to greatly increase the bioavailability of both curcumin and resveratrol.

ix. Consider addition of green tea extract.

15. Dosage: Recommended dosage is beyond the scope of this document, which is the preparation of the liposomal products. Dosage will vary depending on the condition of the person using the product and the therapeutic or nutritional result that is desired.

16. How to take the liposomal products: These products are most effective when taken on an empty stomach and nothing to eat for 30 minutes. So, first thing in the morning and before bed are good times. The liposomal vitamin C product might be dosed additional times per day for some particular purpose.

Ingredient Sources:

Ebay or Amazon sources are going to be much cheaper than retail stores, but be aware that prices for the same commodity can vary by 100%. So, shop around. Explore. Search those sites for, e.g., “bulk glutathione reduced powder” or “bulk curcumin powder” and have the search results ordered by most expensive first to show the bulk order offers.

<http://purebulk.com/resveratrol-powder/>

<http://purebulk.com/curcumin-turmeric-extract-powder/>

<http://purebulk.com/glutathione-reduced-powder/>

Walmart has 1 kilo of sodium ascorbate for \$38: <http://www.walmart.com/ip/Sodium-Ascorbate-Powder-Nutribiotic-2.2-lbs-Powder/31172010>

Soy lecithin granules at \$6.99/lb:

<http://www.nuts.com/cookingbaking/powders/soy-lecithin-granules.html>

Non-GMO Soy lecithin granules at \$7.47/lb:

http://www.bulkapothecary.com/product/supplements/nutritional-oils/lecithin-granules-non-gmo-1-lb/?kpid=Vit-NOW-2260&gclid=CjwKEAajw456hBRDQ4eqg8MzA2W0SJABI2gJ8uqTOFA5_2kLVMOAYxVjkJKRems1to dqWvMaCuBXHoRoCJOTw_wcB



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Non-GMO Sunflower lecithin granules at \$10.49/lb:

http://www.swansonvitamins.com/swanson-premium-sunflower-lecithin-granules-non-gmo-16-oz-454-grams-granules?SourceCode=INTL405&CAWELAID=53000246000006575&catargetid=530002460000098871&cadevice=c&mkwid=F0mwrV2D&pclid=54538968607&gclid=CjwKEAiw456hBRDQ4egg8MzA2W0SJABI2gJ8g1BrrFiE1In7GdKxyeagYzVeej94c9aHp3Vrf3T69hoCJPPw_wcB

Piperine sources:

Ebay – search under this term: Black Pepper Extract, Pure & high quality Piperine powder, Piperine 95% by HPLC

<http://www.powdercity.com/products/piperine-black-pepper#sources>

PQQ (Pyrroloquinoline Quinone) sources:

Stanford Lee, Sales Manager. Herb Nutritionals Co., Ltd

p: +86-21-60491095 | m: +86-15921583263 | e: info@herbnutritionals.com |

w: www.herbnutritionals.com

l a: ECUST Park R&D Center No.8 Lane 1305, Huajing Rd, Shanghai, China.

Mr. Lee has sold me 250 gram package of PQQ for \$1950.

Liposomal Nutrition for Healing and Anti-Aging



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Ultrasound Cleaner Specs: Stainless steel, drain valve, digital temperature reading, timer to 30 minutes, heater (won't use it)
Ultrasound power: 140 watts Heater power: won't use it. Cost around \$150 on Ebay. Capacity: 6L Smaller units do not give you much option for batch size or how you process the product. Search for "6L stainless ultrasound machine".
When processing a batch of liposomal product be sure to watch the temperature and just drop some ice cubes into the bath so that the temperature doesn't rise above 80F-85F (27C-30C).
The ultrasound step is not so much to encapsulate material into liposomes. Instead it breaks up large liposomes produce by the blending step into smaller ones that are more stable and are more efficiently absorbed in the gut.





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The drain valve on this model US machine is convenient to drain the water bath used to surround the bags of product being processed. The water bath is used so that the machine never “runs dry” by having only bagged product in the bin and no liquid. Don’t forget that running dry will burn out the US machine.





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Be sure to put about 1-2" of water in the bin before placing Reynolds baking bags of product into the machine for US processing. Without a water bath the US will over heat and fail.





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The blender should be a decent quality one as you are going to run it for long blend times. Don't worry about overheating the motor as that is what these machines are made for. You bought it to use it. BLENDING IS ALWAYS DONE AT THE SLOWEST BLENDER SPEED.

The blending step is the most important for encapsulation and emulsification, mechanically folding the lecithin and the dissolved other ingredients into fat bubbles or liposomes. Ultrasound processing makes the liposomes smaller and more easily absorbed. You should be able to produce a pretty good liposomal product with the blender even if you decide not to get the US machine. The US process makes a better product, however.





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A funnel like this that fits well into the hole in the blender top makes this whole preparation process much more tidy and cleanup of the kitchen a lot easier.





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Get a good quality stainless steel kitchen thermometer like this one with a similar temperature range. Stay away from glass thermometers for obvious reasons.

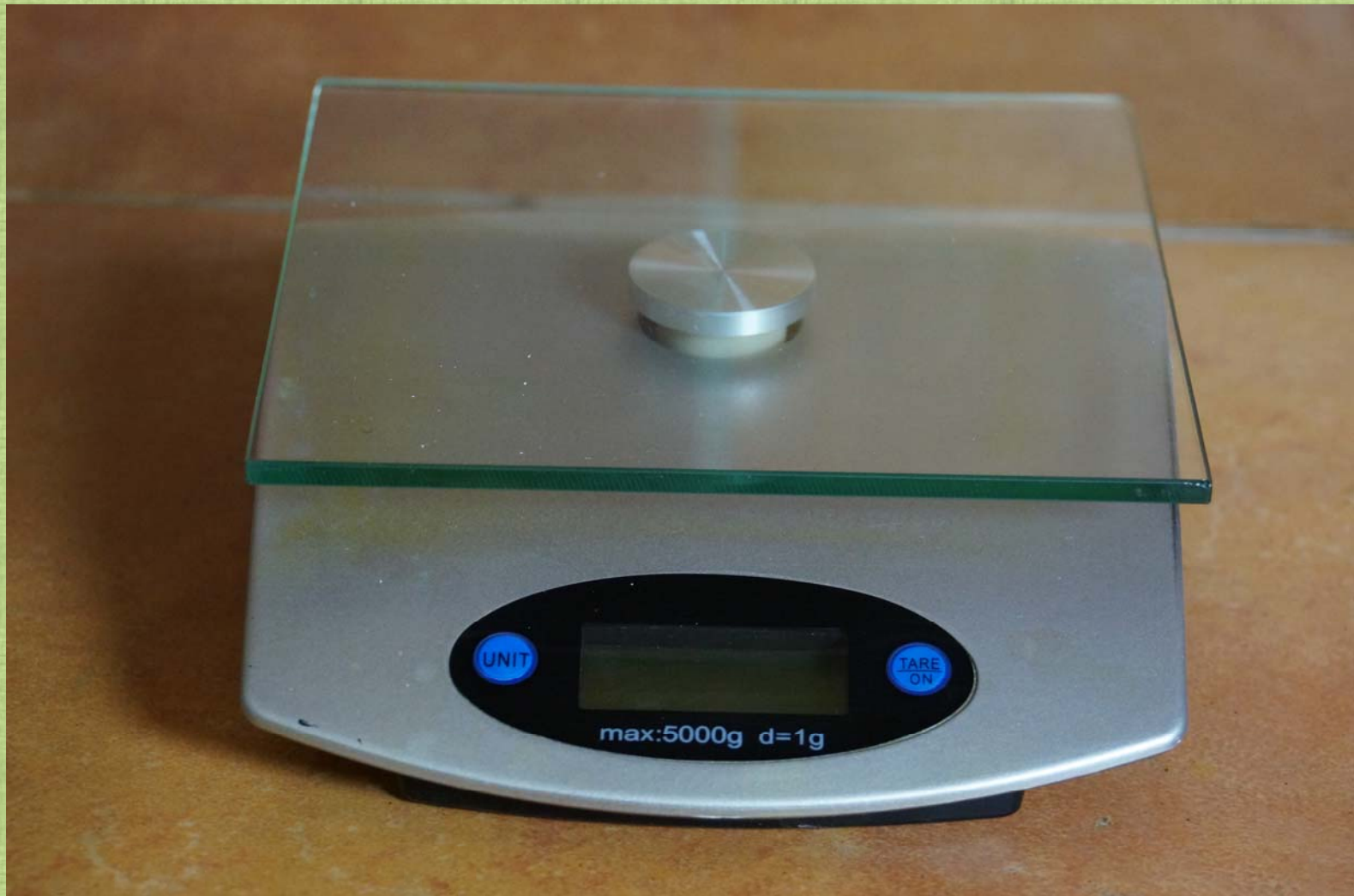




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Get a digital kitchen scale. This one is from Walmart and cost \$20. It is about 6" square. It has a "tare" function for easy weighing. It weighs to 10 pounds (2 ½ kg.) It is precise enough to get whole gram accurate readings and that is fine for our purposes.





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This is 95% pure grain alcohol and is the most convenient alcohol ingredient to use. It is not available in all locations. Alcohol is used to make a liposomal product that is 12% alcohol. So, 1 oz of product has about the same alcohol as 1 oz of wine. For most people this is no problem at all. For alcoholics it probably is a problem. It may be possible to substitute glycerol available from drug stores or online in place of the ethyl alcohol. I have not experimented with that to know what amount of glycerol would produce an improvement in rate of encapsulation similar to the use of ethyl alcohol.

Liquor like vodka or other clear spirits can be used in place of 95% ethanol. Because they contain less alcohol and more water than the 95% material, you will adjust downward the amount of water-ice that is use and this will cause you to have an identical alcohol and water content in the final product.





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Weighing out the liquid ingredients. 114 grams of 95% ethanol is on the scale. 500 grams of water plus ice is in the other glass. Chilling the alcohol in the refrigerator or freezer, or using ice with the water makes it easy to achieve a 55F-60F ingredient temperature at the beginning of the process. That allow blending to be done in one step and still stay below 80F-85F (27C-30C). Overheating will make the liposomal bubbles weak and decrease the percentage of encapsulation.





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Sourcing Ingredients

Shop around. Search on Ebay and Amazon for good deals from vendors that have been around for a while and have thousands of feedbacks at very high levels of satisfaction. There are lots of them. Look for deals where the precise specifications of the product per lab analysis are listed.

Some sourcing suggestions are made on the liposomal recipe document.

Piperine and PQQ are important ingredients but expensive. Shared bulk purchases with friends and NMT colleagues work best. Done this way even the expensive PQQ does not add much to cost. PQQ may be hard to find in bulk. I was able to do a shared purchase of 250 grams from a company in Shanghai that usually has a 1 kg minimum. This purchase at \$2000, shared by 8 people, gave each person enough for a year's worth of the curcumin, resveratrol, piperine, PQQ product.

Turmeric powder is not curcumin powder. 95% curcumin powder is a concentrate from turmeric which itself contains only 5% curcumin.



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Weighing the lecithin. Always use granular lecithin. Never use liquid lecithin. Soy or sunflower lecithin work equally well and differ only in color and flavor. I recommend that you always use GMO free ingredients.





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When weighing ingredients, use an electronic scale similar to this. Put the container on the scale and turn the scale on. This gives you a “tare”, so the displayed weight is just the material that you have added to the container. Use a spoon to control how much you add or take away to get the desired material weight.





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Lecithin is a dry ingredient that pours well into the previously added liquid/ice ingredients are blending at SLOWEST speed. All blending is done at SLOWEST speed.





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Spoon in dry ingredients that are clumpy like the resveratrol while the previously added liquid/ice ingredients are blending at SLOWEST speed. All blending is done at SLOWEST speed.





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After combining the liquid ingredients (any ice used is part of the weighed water), the temperature of the material at the beginning of the blending process should be 55F-60F so that 30 minutes of blending can be done in one step and stay below 80F-85F (27C-30C). Too much heat makes the liposome bubbles weak and they may break lowering the percentage of encapsulated product.





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The more viscous curcumin, resveratrol, piperine, PQQ product generates a bit more heat during the blending process than the liposomal vitamin C-glutathione reduced product due to higher viscosity. You can still blend for about 30 minutes uninterrupted if you begin with ice water so that the starting blender product temperature is 55F-60F. You should be able to blend in one long step and wind up with a product temperature of 80F-85F (27C-30C). When blending, if the temperature should rise too much – usually because the blender blade bearing is worn out and doesn't spin very freely – just put the whole blender container in the refrigerator or freezer for an hour and finish your blend time. Check blender blades removed from the machine for free rotation with your finger and replace a stiff worn out blade assembly as stiff blade assembly bearings cause overheating.





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The more viscous curcumin, resveratrol, piperine, PQQ product generates more heat during the blending process due to the viscosity. You can still blend for about 30 minutes uninterrupted if you begin with ice water so that the starting blender temp is 55F-60F and you should be able to blend in one long step and wind up with a product temperature of 80F-85F (27C-30C). When blending, if the temperature should rise too much – usually because the blender blade bearing is worn out and doesn't spin very freely – just put the whole blender container in the refrigerator or freezer for an hour and finish your blend time. Check blender blades for free rotation with your finger and replace a stiff worn out blade assembly. Check blade movement with the blade removed from the machine.





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Weigh out all ingredients prior to starting the blending process.





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The curcumin, resveratrol, piperine, PQQ product. While the water-ice-alcohol is blending, all the dry ingredients are added to the blender container through the plastic funnel (check kitchen supply stores). You will need to use a silicon rubber spatula to carefully push the unblended dry material down taking care to not touch the blade. You only need to push the dry material into the lower stream of moving mixture. Continue using the spatula until all the dry material is mixed in and the whole mixture begins to move on its own as you see in this picture. The mixture will thin as it heats up to the consistency of very heavy cream.





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Midway in the blending process the curcumin, resveratrol, piperine, PQQ product becomes smoother and not so very viscous.





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The curcumin, resveratrol, piperine, PQQ product by the end of the blending process will pour easily into the container for storage and dispensing.



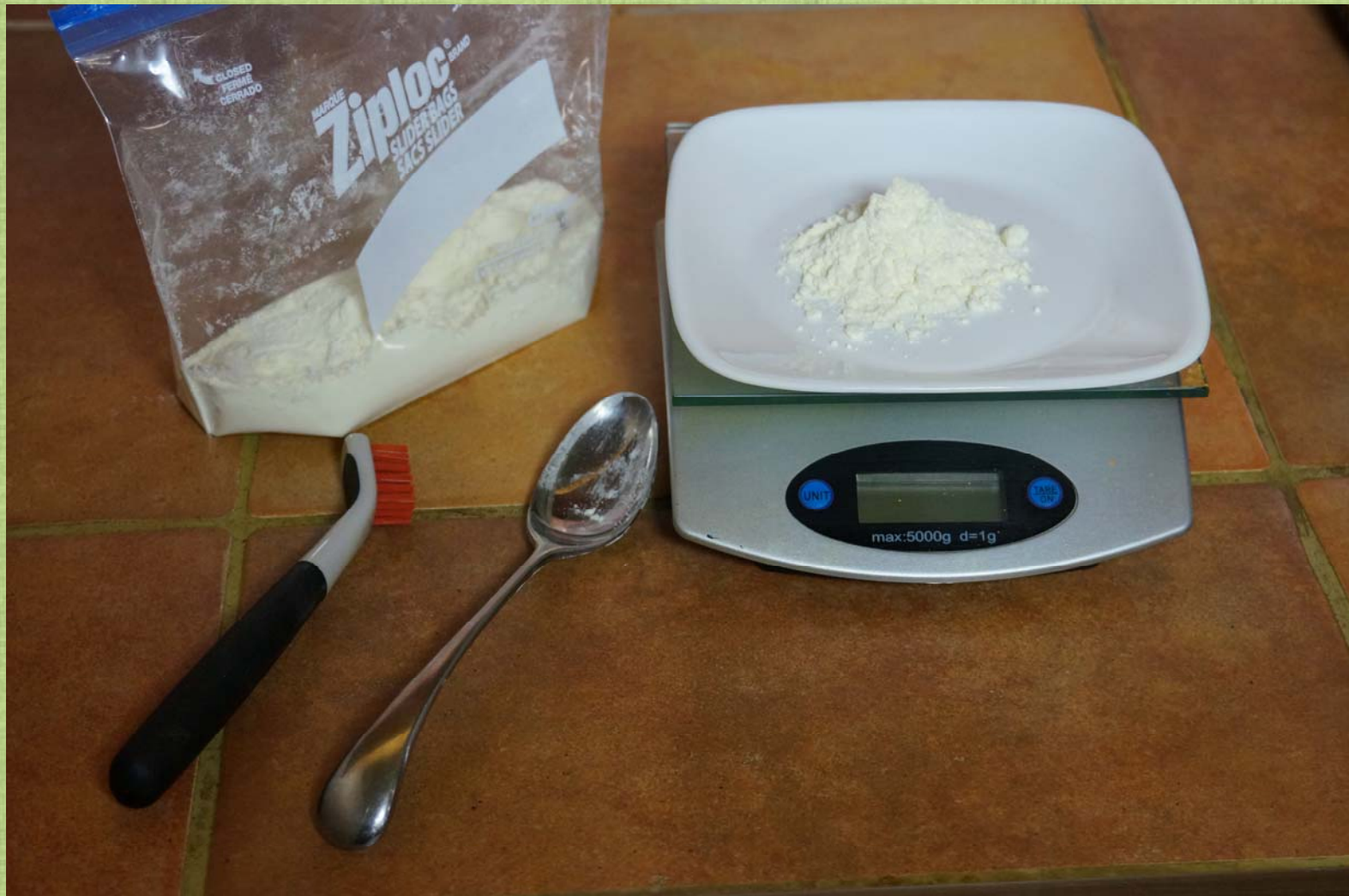


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The piperine, shown here, is a small but important component. This amount shown is enough for a batch of the curcumin product. PQQ is also important but optional. It is expensive and is best purchased as bulk powder. ½ pound is around \$2000. That is enough for 8 people to share and make a batch every 2 weeks for about a year. Ask on the NMT web forum about people interested in shared purchases of components for these liposomal recipes.

A little kitchen brush like the one shown in this picture eliminates waste in material transfer.





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This is the finished liposomal vitamin C and glutathione reduced product. It is a pearly milky liquid due to the way light is dispersed by the liposomal spheres. It is barely the consistency of light cream. In previous recipes for liposomal vitamin C the product would often jell. I think this was more like emulsification and less like the encapsulation we have here. Liposomal vitamin C with glutathione has no tendency to form a jell. Here it was run up the side of a clear wine glass to show the consistency. This batch was 4 days old and shows no signs of separation.





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The curcumin, resveratrol, piperine, PQQ product is thick and opaque as you see here. The inclusions are just air bubbles. The curcumin, resveratrol, piperine, PQQ product has a tendency for very little separation. I believe what happens is that the 95% curcumin has about 5% plant fiber and that the plant fiber initially gets hydrated and then over time a bit of the water can separate. Just mix with a spoon. I believe that the The curcumin, resveratrol, piperine, PQQ product is a combination of encapsulation and emulsification and that is just fine because of the way this product is absorbed. Liposomal encapsulation is more important for the liposomal vitamin C and glutathione reduced product.





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Check the blender blade assembly for free spin. If the blade can't be spun easily with a finger it is worn out and should be replaced as it will generate a lot of heat and be a problem.





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Pour the product into a Reynolds Oven Bag and tie it closed or rubber band it securely in ready for the US processing.





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Use Reynolds Oven Bags to hold the product for US processing. I wouldn't cook food in plastic bags, but there is little risk of leaching toxins from the plastic at the low temperatures we are working.





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Bagged product ready to process in the US machine.





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Make sure the tub has 1-2 inches of water as a bath for the bag of product to prevent running dry?





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Monitor the temperature gauge of the US machine to keep temperature below 30C.





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Every 3-5 minutes lift the bag out of the US machine and squeeze it several times to mix the contents and allow it to be US radiated more evenly and without local hot spots in the contents.





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BPA-free 16 oz water bottle with 1 ½ inch mouth and snap closed spout. \$1.00 from the Dollar Store.

