

New Method to Make the Highest Quality Liposomal Vitamin C

Introduction

I've built this website (<http://qualityliposomalvc.com/index.html>) to help people create the very highest quality liposomal vitamin C in their own home.

In my quest to discover the optimal formulation and technique I have read hundreds of research papers, reviewed patents and read or watched the accounts of many people who make their own liposomal vitamin C.

I then purchased high quality laboratory equipment and sourced large quantities of ingredients to experiment with over the last eight months.

I discovered that it's possible to make liposomal vitamin C of the same or higher quality than the large manufacturers using only a blender!

This website has four sections to share my research and methods:

- [Introduction](#)
- [Results of My Research](#)
- [Equipment Required](#)
- [Process](#)

As you'll notice this website sells nothing (it doesn't even have advertising) and there are no links to any liposomal vitamin C manufacturers except LivOn Labs which is used as an example of the dominant manufacturer. I created and host this website at my own expense simply to help people make better liposomal vitamin C to improve their health.

Finally, the standard disclaimer you see everywhere: I'm not a doctor, the FDA has evaluated nothing and you take your own responsibility for anything you do after reading this website!

Thanks!

Chris

Research Overview

Liposomes were first described in 1961 and have since found use in everything from drugs to expensive skin creams. Their properties and associated manufacturing techniques have been extensively studied.

Unfortunately, much of this research is not easy to read for the non-scientist.

Additionally, current research is focussed on binding various other chemicals to liposomes which themselves are created out of hybrid compounds to provide specific pharmaceutical properties.

Thankfully, we're interested only in creating simple liposomes from readily available non-toxic materials.

The following are the key findings from my research into creating the best possible liposomal vitamin C.

Liposomes are Easy to Make

It turns out that lecithin phospholipids really like to make liposomes!

Despite the marketing material created by such companies as [LivOn Labs](#) liposomes are actually very easy to make. You don't need a high pressure injection system, or even an ultrasound machine!

LivOn Labs recently purchased the US patent number 20120171280A1 that is snappily named '[Method of making liposomes, liposome compositions made by the methods, and methods of using the same](#)'. It describes a method of making better liposomes than LivOn Labs without the need for any specialized equipment!

The inventor, Yuanpeng Zhang, has a long history of working with liposomes and has a number of related patents to his name.

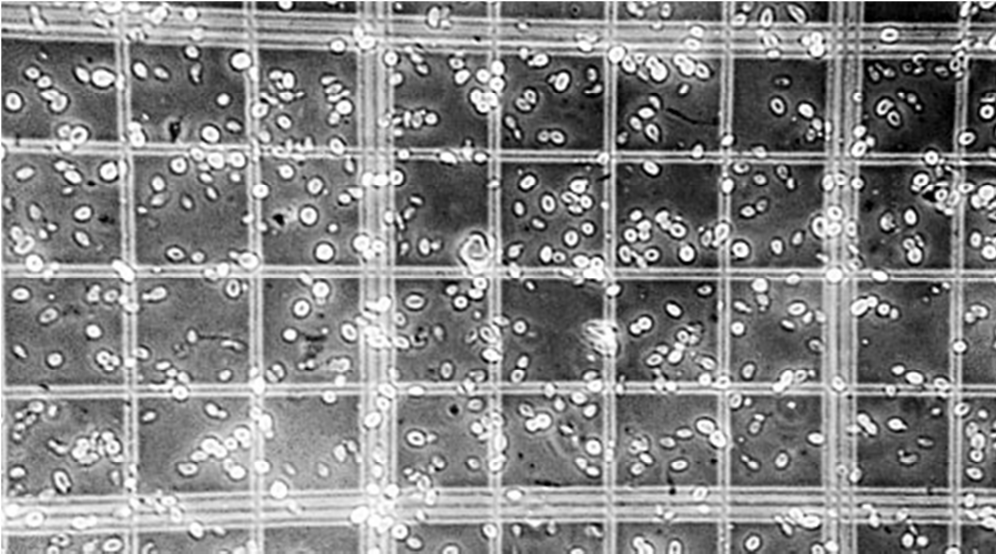
The summary of his invention is that high quality liposomes may be created using only a blender, water, alcohol and vitamin C - and that these liposomes are better than the ones produced by LivOn Labs!

It's no wonder that LivOn Labs purchased this patent!

This is fantastic news for all those people that need liposomal vitamin C but don't have the resources to purchase expensive equipment or liposomal vitamin C directly from LivOn Labs.

A legal disclaimer: my understanding is that if you're in the United States (where this patent is valid) then you shouldn't attempt to use the method described in this patent without approval from Livon Labs.

It is typically impossible for the home manufacturer to validate that they have created liposomes. However, I'm fortunate that I have access to a biological research lab and have used their microscopes to confirm liposome creation. The following is a picture of the liposomes that have been created using the [Process](#) described on this website. The picture is a little odd looking because the attached camera was broken and I had to use a standard 'point-and-shoot' camera.



Liposomes we've created under a microscope

Alcohol is Important

The majority of the liposomal vitamin C community is not aware that alcohol is very helpful in the creation of liposomes.

It is well established that organic solvents help phospholipids form liposomes. While there are many dangerous organic solvents, the one we're interested in is ethyl alcohol. This is the same type of alcohol that is in your beer, wine and vodka. Its safety has been established over many years and includes long term testing by the author of this website!

LivOn Labs is the current market leader in liposomal vitamin C. Their recipe includes 12% alcohol by weight as a 'natural preservative', however, it turns out that this alcohol is also key to creating liposomes.

See the patent reference in the previous section for more detail.

Saturation Matters

Every recipe I've read on the Internet calls for dissolving a relatively small amount of vitamin C in water.

For example, the original '[Brooks Bradley](#)' recipe calls for dissolving 1 level tablespoon (about 6 grams) of vitamin C in a total of 1.5 cups of water. However, vitamin C solubility is 330 g/L which means that 124 grams of vitamin C will dissolve into that same 1.5 cups of water.

By way of illustration, here is what the difference looks like. On the left is one level tablespoon of vitamin C (6 grams) and on the right is the total amount of vitamin C that will dissolve into that same 1.5 cups of water. There is twenty times more vitamin C on the right!



One tablespoon of vitamin C versus saturation levels of vitamin C

Since liposomes will encapsulate anything that is dissolved in water, you can make your liposomal vitamin C twenty times stronger without any other adjustments to your recipe. Wow!

Lecithin Granule Amounts

Most Internet recipes call for a relatively small amount of lecithin.

It is important that you use lecithin granules as they have very little soy protein and are higher in the components that actually make liposomes such as phosphatidylcholine.

Where I live it is difficult to source high phosphatidylcholine (PC) lecithin. My current source is 20kg boxes of Solec P from the Solae Company (a subsidiary of Du Pont). It has a 22% phosphatidylcholine content and seems to work well in my recipe.

Generally you'll want to use as many lecithin granules as possible as this provides the highest possible encapsulation of the vitamin C.

The limiting factor is that the resulting mixture needs to be liquid enough at around 32°C that the ultrasound machine is able to drive out the bubbles that are created by the blending process. Bubbles in the liquid absorb ultrasonic energy and significantly reduce the amount of ultrasonic energy that goes into making liposomes.

Dissolving Lecithin Granules

The lecithin granules take time in order to dissolve completely. Most Internet recipes call for soaking the lecithin granules in water overnight.

This idea is correct, however, by soaking in water you end up lowering the amount of vitamin C that will be encapsulated.

I recommend making the saturated solution of vitamin C, water and alcohol (as described in the [Process](#) section) and then dissolve the lecithin granules in this. Doing so will maximize the amount of vitamin C that will be encapsulated.

I do the dissolving in a blender so that I can blend it five or six times over the course of 12 hours. Even if you don't have an ultrasound machine this will significantly encapsulate the vitamin C as described in [patent US 20120171280A1](#) that was purchased by Livon Labs.

Ultrasonic Irradiation

In my experimentation the optimal temperature for creating liposomes is less than 32°C. When you get above 35°C the liposomes start breaking down and lower your encapsulation percentage.

In my recipe I ultrasound above 32°C for the first round in order to drive out bubbles in the liquid. Removing these bubbled improves the ultrasonic energy that is used to create liposomes. After this first round I ultrasound below 32°C to optimize liposome creation.

According to my research a total irradiation time of around an hour is optimal, however, at least ten minutes after you've driven out the bubbles should be sufficient depending on the power of your ultrasound machine.

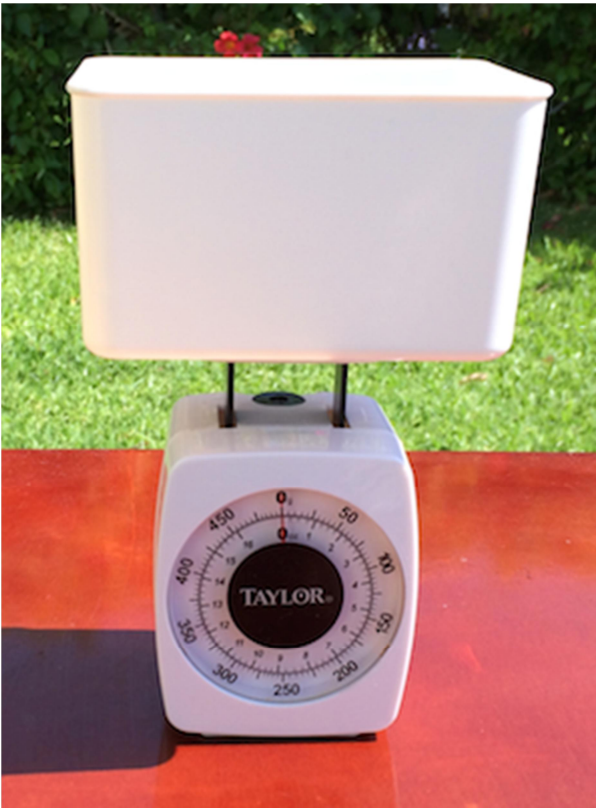
Equipment Overview

This section details the equipment that I use in the production of liposomal vitamin C.

Even if you don't have an ultrasound machine you can still make excellent liposomal vitamin C. See the [Research](#) section for more detail.

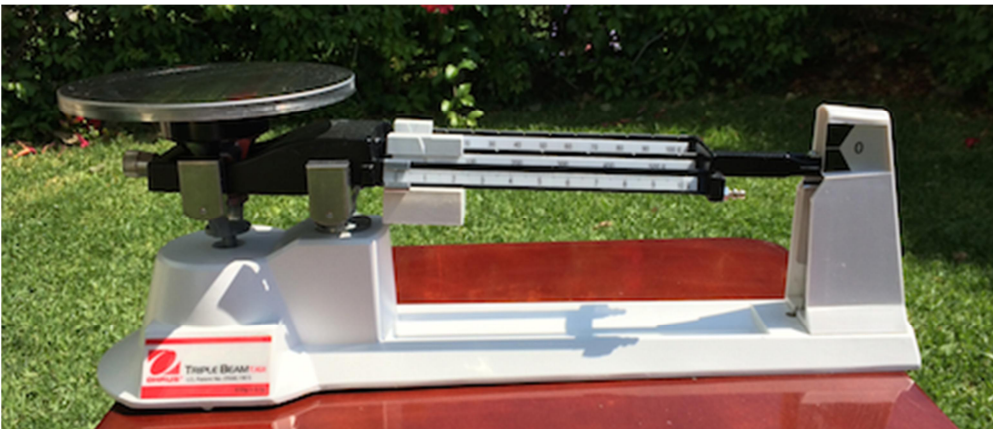
Measuring Device

You'll need to have a scale to weigh the ingredients. Correct measurement is important for repeatable results. My first scale was this cheap one:



Cheap Scale

I then moved up to the Ohaus Triple Beam TJ611 with extra weights. This type of scale isn't required to make liposomal vitamin C, however, I also make liposomal antibiotics and the increased precision is helpful.



A Better Scale

Regardless of your choice of scale, make sure to use it!

Blender

You'll need a blender to help dissolve the lecithin granules in the saturated vitamin C solution. I use a cheap household blender with a snazzy silver plastic base for extra liposomal power!



A cheap blender

Ultrasonic Bath

I use an Elmasonic p60h ultrasonic bath. It has multiple frequencies, modes and an internal heater.



Elmasonic p60h Ultrasonic Bath

I picked it because of its long duty cycles and high power. If you can afford it, I definitely recommend it!

The good news is that even if you can't afford a cheap ultrasonic bath you can still make great liposomes! (See the [Research](#) section)

Thermometer

If your ultrasound machine doesn't have a built in thermometer, or you don't have an ultrasound machine, you'll need a separate thermometer. Performing the various steps of the [Process](#) at the correct temperatures is important.

The critical temperatures you'll be watching for are between 30°C and 40°C. A thermometer for measuring your temperature if you're sick should be fine so long as you can immerse the part that does the measurement.

To say again - the correct temperature matters so be sure you have a thermometer that can measure between 30°C and 40°C!

Glassware

I purchased a number of glass beakers for use with the ultrasound machine. It is important that the beakers are glass because plastic will significantly weaken the ultrasonic energy. If you have a less powerful ultrasound you might consider making the liposomal vitamin C directly in the machine.

WARNING: Be sure that nothing solid rests on the bottom of the ultrasonic bath as you will damage the machine.



A One Litre Beaker

I selected a one litre beaker as it fit in my ultrasonic bath and can hold one blenders' worth of liposomal vitamin C.

Storage

The liposomal vitamin C ingredients are susceptible to both moisture and light. With the exception of the alcohol, I store all my ingredients in large wide mouth Ball canning jars. In each jar I place a few 'moisture absorption' packets to help extract any excess humidity.



Glass Canning Jar with Moisture Absorption Packets

The finished liposomal vitamin C should be stored in the fridge.

Process Overview

This section outlines the process to create liposomal vitamin C. For details on the equipment needed please refer to the [Equipment](#) section. The sizing of this recipe is for a standard sized blender and a one litre beaker.

For background on why I've selected this particular process read the [Research](#) section. This recipe should yield liposomal vitamin C the same or better than can be purchased online from the large manufacturers.

At each step I specify the modification to the process if you don't have an ultrasound machine.

Ingredients

There are two versions of the ingredients. The first is for those that have access to 98% pure ethyl alcohol. The second is for those that only have access to vodka, or a similarly strong spirit. It is recommended that the vodka, or other clear spirit has as little added color and taste as possible.

The amount of vitamin C is just under the saturation level for the specified water and alcohol in this recipe. Since it is almost the maximum amount of vitamin C that can be dissolved it will give the highest potency liposomal vitamin C

possible.

The vitamin C I use is ascorbic acid. I haven't tried it with sodium ascorbate, although so long as it dissolves into the water and alcohol it should be easily encapsulated.

The 12% alcohol by weight was chosen because it falls within range specified by the patent (see [Research](#)) and is the same used by Livon Labs. The alcohol is included because it is very helpful in forming liposomes.

The lecithin granules are 22% phosphatidylcholine. For my liposomal vitamin C I use the Solec F' brand from 'The Solae Company'. Be sure to use lecithin granules instead of liquid lecithin.

Ethyl Alcohol Ingredients

These ingredients should be used if you have access to 98% pure ethyl alcohol. This ethyl alcohol recipe is the one I use for my personal liposomal vitamin C. The following table shows the ingredients and their order of use.

ingredient	percent	grams
water	50.3%	477.6
100% ethyl alcohol	12.1%	114.8
vitamin C	16.9%	160.5
lecithin	20.7%	197.1

All the ingredients are measured by weight. If you need to convert the grams into ounces for your scale multiply the grams by 0.035274.

70% Alcohol Ingredients

These ingredients should be used if you have access to 70% ethyl alcohol. The following table shows the ingredients and their order of use.

ingredient	percent	grams
water	43.7%	415.3
70% ethyl alcohol	18.6%	177.1
vitamin C	16.9%	160.5
lecithin	20.7%	197.1

All the ingredients are measured by weight. If you need to convert the grams into ounces for your scale multiply the grams by 0.035274.

Vodka Ingredients

These ingredients should be used if you have access to vodka or other clear 40% spirit instead of ethyl alcohol. The following table shows the ingredients and their order of use.

ingredient	percent	grams
water	26.8%	254.6
40% vodka or spirit	35.6%	337.8
vitamin C	16.9%	160.5
lecithin	20.7%	197.1

All the ingredients are measured by weight. If you need to convert the grams into ounces for your scale multiply the grams by 0.035274.

Changing the Recipe Size

Both these recipes have been chosen to fit into a standard sized blender and a 1L beaker. The total weight of the ingredients is 950g and it makes about 800ml liposomal vitamin C after the bubbles have been removed. Before the bubbles have been removed the volume will be closer to 900ml.

You may adjust the recipe to these common sizes by dividing the quantities by the specified amount.

required size	divide by
1/2 cup	6.40
1 cup	3.20
1 1/2 cups	2.13
2 cups	1.60
2 1/2 cups	1.28
3 cups	1.07

For example, if you want to make 2 cups of liposomal vitamin C after the bubbles have been removed you'd divide all the quantities in your selected recipe by 1.6.

All measurements need to be done by weight, especially the vitamin C and lecithin granules. Using tablespoons or teaspoons will not provide the accuracy required because these ingredients may have different densities when purchased from different sources.

If you don't have a scale you should purchase a cheap kitchen scale (see the [Equipment](#) page).

Step 1: Dissolve Vitamin C in Water and Alcohol

Measure and add the water, alcohol and vitamin C to the beaker. Place the beaker in the ultrasonic bath and heat to 35°C while irradiating. Be sure the ultrasonic machine is not set to sweep and that you stir the mixture regularly. As a

general caution, be sure your beaker isn't touching the sides or bottom of the ultrasonic bath and that the water in the ultrasonic bath is to the level recommended by the manufacturer.



The vitamin C about to be dissolved in the water and alcohol



Settings for the ultrasound machine

I use a cardboard form to keep the beaker from touching the bottom of the ultrasonic tank. I have a stainless steel basket as well, however, the ultrasonic power is noticeably less when I use the basket instead of suspending the beaker in the water with the cardboard.

The following is short video showing the process of dissolving the vitamin C in the water and alcohol.

When this process completes the temperature will be close to 40°C and the liquid will be clear with perhaps a very slight yellowish tinge. In the Elmasonic p60h it takes about 15 minutes to dissolve the vitamin C with intermittent stirring.

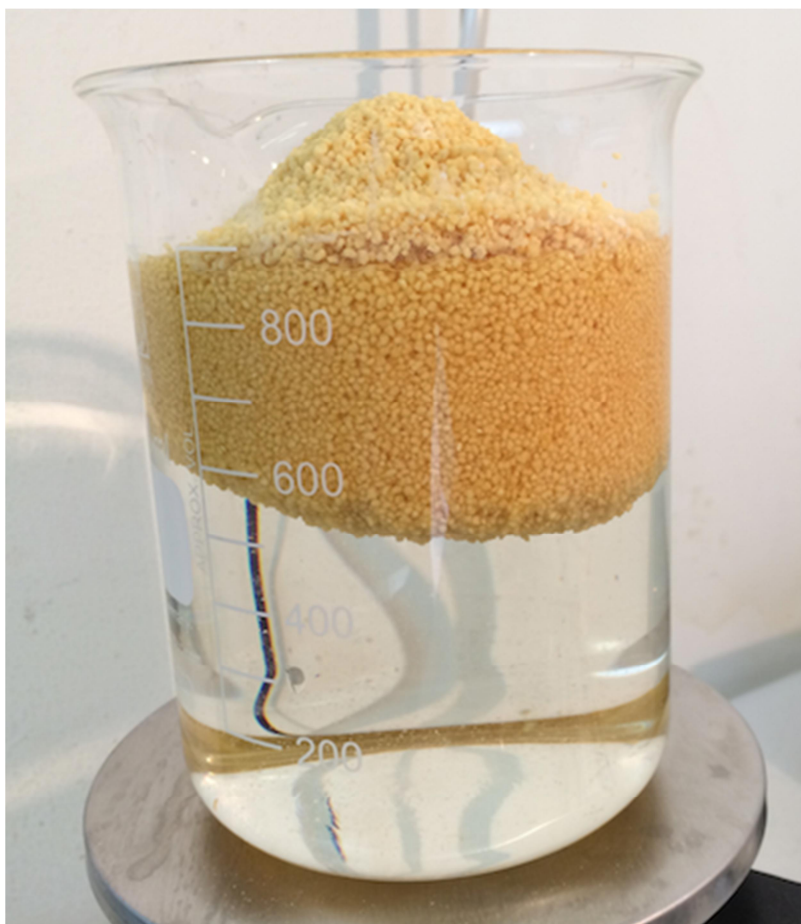
If you don't have an ultrasonic machine simply place the water, alcohol and vitamin C on the stove and heat while stirring. Be sure to turn off the heat when the vitamin C starts to dissolve. Keep on stirring until the vitamin C has been completely dissolved. You may add a little more heat at intervals if its needed to continue the dissolving process.

Step 2: Add Lecithin and Blend

Important Note:

There have been reports from people using this recipe that the resulting mixture was much too thick after adding the lecithin. If you are trying this recipe for the first time hold back 20% of the lecithin until after you've blended it for the first time. If it looks too watery, then slowly add a little more and blend again. Repeat this process until the resulting mixture is still liquid and can pour easily. I suspect this issue may be caused by different lecithin granule manufacturing processes.

Add the lecithin to the beaker and then promptly pour into the blender. If you're separately measuring the ingredients then you can add the lecithin granules directly to the blender. I do a cumulative weight and thus I need to add it to the beaker first.



Lecithin granules added to the water, alcohol and dissolved vitamin C



Mixture promptly poured into the blender

Blend for about four minutes. It is important that mixture is nicely warm to touch as this ensures that the lecithin granules have melted and avoids any chance of separation. When finished, place the mixture in the refrigerator.



First blend completed and ready for the refrigerator

Repeat this blending and refrigerating process five or six times over twelve hours to be sure the lecithin granules have been thoroughly dissolved into the water, alcohol and vitamin C solution. For my personal use I often do the blend and refrigerate cycle for 24 hours.

The liposomal C it will heat up when you are blending it. With the exception of the first blending cycle, be sure that the temperature doesn't exceed 32°C. For my blender this takes only two to three minutes of blending.

This longer blending process should also remove the 'snotty' strands that often appear in home made liposomal vitamin C. Not only are these strands a little unpleasant to drink, but I suspect that they don't encapsulate much vitamin C.

By the end of this process you've already created high quality liposomal vitamin C. The following steps show you how to improve it further using an ultrasound machine.

If you don't have an ultrasound machine you may want to do more blending and refrigeration cycles and then skip to step 5!

Step 3: Remove the Bubbles

The blending process will add tiny bubbles to your liposomal vitamin C. For the ultrasound machine to work at peak efficiency you're going to want to remove these bubbles. This process is also known as 'degassing'.

Blend the mixture a final time until the blender jar feels warm to the touch. The liposomal vitamin C should now be

about 35°C. Pour the liposomal vitamin C into the beaker and cover with some clear plastic wrap.

Next place the beaker in the ultrasound machine for about 30 minutes or until the bubbles have been removed. Below are a series of photos showing the bubbles being driven out of the mixture over time by the ultrasound machine. The color has been modified to make it easier to see the bubbles moving upwards. The horizontal line indicates the current bottom of the bubbles.



Bubbles leaving the liposomal vitamin C

When the bubbles have been removed the liposomal vitamin C should look like this. Notice the much more defined line between the bubbles on the top and liquid on the bottom.



Bubbles removed from liposomal vitamin C

Now place the beaker with the liposomal vitamin C in the refrigerator for a few hours to cool it down.

This step may break down some encapsulation due to excess heat, however, it is necessary to remove the bubbles. The encapsulation will be increased significantly in the next step.

If you don't have an ultrasound machine you should skip this step.

Step 4: Make the Liposomes

Actually, you've already made lots of liposomes! This step will increase your encapsulation percentage even higher.

Place your liposomal vitamin C in the beaker into your ultrasound machine and irradiate it until the temperature reaches 32°C. Once it does, place the beaker back into your refrigerator for an hour or so to cool it down again.

Repeat this process until the liposomal vitamin C has had an hour of cumulative ultrasonic irradiation.

If you don't have an ultrasound machine you should skip this step.

Step 5: Done!

Skim off the bubbles on the top of the liposomal C and pour into a glass container and place in your refrigerator.

This video shows the viscosity of the finished product at 30°C.

<http://vimeo.com/93037232>

You're finally ready to enjoy the uniquely refreshing flavour of liposomal vitamin C!

This recipe contains about 0.2 grams of vitamin C per millilitre. I usually take about 60ml per day in the evening. This works out to about 12 grams of vitamin C.