



INSTRUCTIONS

NANOSTABILIZER®-LT

USER GUIDE:

WITH ISP-3600 PROCESSOR IN THE FLOW-THROUGH CONFIGURATION



INDUSTRIAL

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MATERIALS NEEDED:

- ISP-3600 ultrasonic processor configured in the flow-through mode (see ISP-3600 User Manual and ISP-3600 Peripheral Equipment Assembly Guide for details);
- Digital scale, peristaltic pump, ultra-large capacity in-line filter assembly with 0.22 micron cartridge, 10 ml vials, disposable pipettes, dark-glass presterilized finished product containers (enough to fit 40 L), magnetic stirrer with hotplate, stir bar, 2 – 3 L beaker (pre-mix vessel), 100 ml beaker;
- NanoStabilizer®-LT, cannabis extract (e.g., isolate, distillate, full-spectrum oil, etc.), distilled water.

INSTRUCTIONS FOR MAKING 40 L OF TRANSLUCENT NANOEMULSION:

The instructions below detail the method for preparing 40 L of a translucent nanoemulsion with the cannabis extract concentration of **20 mg/ml**. If a different concentration is desired, use the table below and substitute the bolded numbers in the instructions with the numbers in the colored boxes.

Cannabis extract concentration in nanoemulsion	10 mg/ml	20 mg/ml	30 mg/ml	40 mg/ml	50 mg/ml
Cannabis extract (kg)	0.4	0.8	1.2	1.6	2
NanoStabilizer®-LT (kg)	2	4	6	8	10
Distilled water (kg)	37.6	35.2	32.8	30.4	28
Total (kg)	40	40	40	40	40
Number of 10 mg doses of cannabis extract per 40 L/40 kg of nanoemulsion	40,000	80,000	120,000	160,000	200,000

Mixing your cannabis extract with NanoStabilizer®-LT:

1

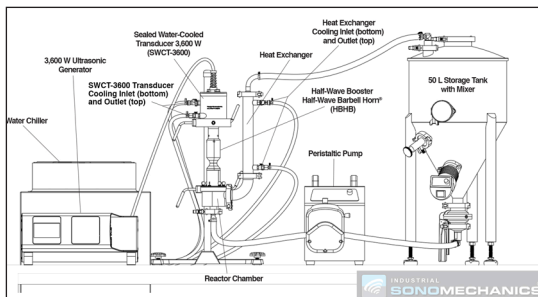
In this step, you will mix your cannabis extract with NanoStabilizer®-LT in the pre-mix vessel. We recommend that you prepare an excess (10 %) of this pre-mix as when transferring to the storage tank with mixer (see schematic below) in Step 3, some may remain in the pre-mix vessel (for future use). To accurately dispense **4.4 kg** of NanoStabilizer®-LT (**4 kg** + **400 g** of excess) and **880 g** of your cannabis extract (**800 g** + **80 g** of excess), follow the directions below.

- a. Place the pre-mix vessel with a stir bar onto the magnetic stirrer with hotplate.
- b. Place the NanoStabilizer®-LT container on the digital scale and tare. Begin dispensing NanoStabilizer®-LT into the pre-mix vessel, periodically placing its container back on the digital scale. Be careful to dispense NanoStabilizer®-LT into the pre-mix vessel and not to spill it onto the inner wall or outside.
- c. Take note of the mass each time the NanoStabilizer®-LT container is placed back on the digital scale – the negative of that number indicates how much NanoStabilizer®-LT has been removed from the container. To ensure accurate measurement, as you get closer to your target value (**-4.4 kg** in this case), dispense decreasingly smaller amounts. Continue this until **4.4 kg** have been removed from the NanoStabilizer®-LT container (the digital scale reads: “**-4.4 kg**”).
- d. Follow a similar procedure to accurately dispense **880 g** of your cannabis extract into the pre-mix vessel.
- e. Stir the contents of the pre-mix vessel until your cannabis extract is dissolved in NanoStabilizer®-LT. Apply heat if necessary, but do not allow the liquid temperature to exceed 70 °C (158 °F).

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Preparing the aqueous phase and setting up your process recirculation network:

- a. Assemble the ISP-3600 ultrasonic processor in the flow-through mode (see ISP-3600 User Manual, ISP-3600 Peripheral Equipment Assembly Guide, and schematic on the right for details).
- b. Dispense **35.2 L/35.2 kg** of distilled water into



the storage tank with mixer. Start running the mixer at a high speed (80 – 100 %).

- c. Check that all connections in the process recirculation network are properly clamped. The distilled water should be set up to flow from the bottom of the storage tank with mixer to the reactor chamber and back to the top of the storage tank with mixer (see ISP-3600 User Manual and ISP-3600 Peripheral Equipment Assembly Guide for details).
- d. Open the valve on the bottom of the storage tank with mixer. Turn the pump ON, then immediately OFF and check for any leaks in the process recirculation network. For assurance, perform this step several times. If no leaks are observed, proceed to the next step.
- e. Turn the pump ON and begin recirculating the distilled water at the flow rate of 1 - 3 L/min (50 - 150 RPM).
- f. Make sure that cooling lines are connected to the transducer's cooling jacket and the heat exchanger (see ISP-3600 User Manual for details). Check for kinks or leaks in these lines. Do not turn on the water chiller yet.

3 Mixing the oil phase into the aqueous phase in the storage tank with mixer:

- a. While your distilled water is flowing through the recirculation network and is being stirred by the tank mixer, place the pre-mix vessel onto the digital scale and tear.
- b. Similarly to Step 1, use the negative reading on the digital scale to dispense exactly **4.8** kg of the oil phase from the pre-mix vessel into the storage tank with mixer.
- c. Continue stirring and recirculating the liquid in the storage tank with mixer until you finish Step **4e**. Make sure not to introduce air bubbles into the liquid by excessively vigorous stirring. Lower the mixer speed if necessary.

4 Ultrasonic Processing:

In this step, ultrasonic processing will commence. Refer to ISP-3600 User Manual for operating instructions.

- a. Turn on the water chiller and verify that the transducer and reactor chamber are being cooled correctly (see ISP-3600 User Manual for details).
- b. Set the ultrasonic amplitude to 80 % (see ISP-3600 User Manual for details). Note that this setting can be adjusted up or down to optimize the results.

- c.** Initiate ultrasound and start timing. Try to maintain the processed liquid temperature at 45 – 60 °C (113 – 140 °F) throughout processing (you may temporarily disconnect the heat exchanger's cooling inlet line if the processed liquid becomes too cold). Turn off the chiller when disconnecting the line, then turn it on again.
- d.** After processing for 2 hours, draw a sample into a 10 ml vial every 10 minutes and notice the degree of translucency. When two consecutive samples exhibit no difference in translucency, the ultrasonic processing is complete.
- e.** Stop ultrasound and allow the processed liquid to recirculate and cool for 10 minutes.
- f.** Stop the pump, reverse its direction and start it again in order to collect all of the nanoemulsion from the tubing, heat exchanger, and reactor chamber into the storage tank with mixer.
- g.** Stop the pump and return its direction to the original setting.

5

Filtration:

In this step, you will use the ultra-large capacity in-line filter assembly with 0.22 micron cartridge to remove any microorganisms and particulate contaminants from your nanoemulsion as you collect it in the finished product container.

Click the link or scan QR code below to see instructional video on filtration:

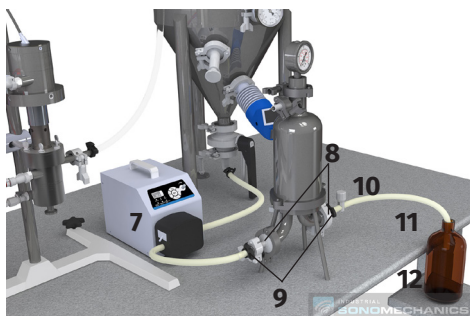
<https://youtu.be/NNSmQ3rN3As?si=5wvFZajECtA-t0e4>



PARTS NEEDED:



1. 0.22 micron filter cartridge
2. a. Filter housing top
b. Filter housing base
c. Bleed valve
3. 2x 1.5" sanitary clamp
4. 2x 1.5" sanitary gasket
5. 4" sanitary clamp
6. 4" sanitary gasket
7. Peristaltic pump with #82 silicone tubing
8. 2x 1.5" sanitary to 5/8" hose barb adapters
9. 2x plastic snap clip for #82 silicone tubing
10. Outlet pinch-valve
11. #82 silicone tubing for the filter outlet
12. Finished product container(s)



- a. Close the bottom outlet valve of the storage tank with mixer. Detach the outlet line from the reactor chamber and connect it to the inlet of the filter housing base (**2b**). Assemble the rest of the items **1 – 12** as shown above.
- b. Close the outlet pinch valve (**10**) by turning it clockwise. Open the bleed valve (**2c**) and open the bottom outlet valve of the storage tank with mixer.
- c. Set the pump (**7**) flow rate to 1 L/min (approximately 50 RPM), hold the 100 ml beaker underneath the bleed valve (**2c**), and be ready to turn the pump (**7**) OFF once the bleed valve (**2c**) starts to release the nanoemulsion. Turn the pump (**7**) ON and wait until the nanoemulsion starts to come out of the bleed valve (**2c**) then immediately turn the pump (**7**) OFF and close the bleed valve (**2c**). Add the nanoemulsion in the 100 ml beaker back into the storage tank. The filter housing top (**2a**) is now filled with your nanoemulsion. Open the pinch valve (**10**) by turning it counterclockwise.
- d. Turn the pump (**7**) ON and pass the nanoemulsion through the ultra-large capacity in-line filter assembly into the first presterilized finished product container (**12**). It is recommended to place the finished product container (**12**) below the level of the filter assembly. Once the presterilized finished product container is almost full, stop the pump and wait until the nanoemulsion stops flowing.
- e. Carefully remove the silicone tubing (**11**) from the filled presterilized finished product container (**12**) and place it into an empty presterilized finished product container (**12**). Tightly close the filled finished product container.
- f. Repeat steps **d** and **e** until the entire 40 L of nanoemulsion has been filtered.
- g. Store the finished product containers with the filtered nanoemulsion in a cool and dark place.
- h. Gently flush the ultra-large capacity in-line filter assembly by pumping distilled water through it in both directions until the water runs clean. Disassemble the assembly, remove the 0.22 micron filter cartridge and air-dry it on a dish rack.

To re-order NanoStabilizer®-LT and replacement filter cartridges, please use the link or scan QR code below to visit our online store.

<https://sonomechanics.myshopify.com>





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