



INSTRUCTIONS

NANOSTABILIZER®-LT

USER GUIDE:

WITH LSP-600 PROCESSOR IN THE FLOW-THROUGH CONFIGURATION



INDUSTRIAL
SONOMECHANICS®

Sonomechanics.com

MATERIALS NEEDED:

- LSP-600 ultrasonic processor assembled in the flow-through mode (see LSP-600 User Manual for details);
- Digital scale, peristaltic pump (optionally provided), in-line sterilizing filter (optionally provided), 10 ml vials, IR thermometer, disposable pipettes;
- 1 - 2 L beaker with a bottom outlet (process vessel, optionally provided), magnetic stirrer with hotplate and stir-bars (optionally provided), 200 ml beaker (pre-mix vessel), dark-glass storage container (finished product container);
- NanoStabilizer®-LT, cannabis extract (e.g., isolate, distillate, full-spectrum oil, etc.), distilled water.

INSTRUCTIONS FOR MAKING 1000 ml OF TRANSLUCENT NANOEMULSION:

The instructions below detail the method for preparing 1000 ml 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	10 g	20 g	30 g	40 g	50 g
NanoStabilizer®-LT	50 g	100 g	150 g	200 g	250 g
Distilled water	940 g	880 g	820 g	760 g	700 g
Total	1,000 g	1,000 g	1,000 g	1,000 g	1,000 g
Number of 10 mg doses per 1,000 ml of nanoemulsion	1,000	2,000	3,000	4,000	5,000

1

Mixing your cannabis extract with NanoStabilizer®-LT:

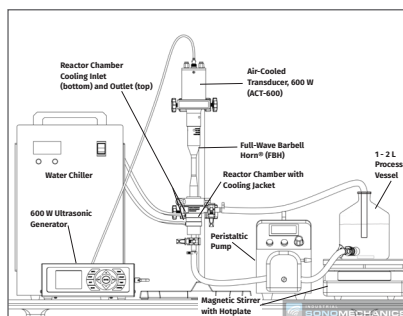
In this step, you will mix your cannabis extract with NanoStabilizer®-LT in the pre-mix vessel. We recommend that you prepare an excess (10%) of this pre-mix as some may remain in the pre-mix vessel (for future use) when transferring to the process vessel (Step 3). To accurately dispense **110 g** of NanoStabilizer®-LT (**100 g + 10 g** of excess) and **22 g** of your cannabis extract (**20 g + 2 g** of excess), follow the directions below.

- Place the pre-mix vessel with a stir-bar on the magnetic stirrer with hotplate.
- Place the NanoStabilizer®-LT container on the digital scale and tear. Begin dispensing small amounts from the NanoStabilizer®-LT container into the pre-mix vessel, periodically placing the NanoStabilizer®-LT container back on the digital scale, dispensing NanoStabilizer®-LT into the pre-mix vessel and not to spill it onto the inner wall or outside.
- 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 (**-110 g** in this case), dispense decreasingly smaller amounts. Continue this until **110 g** have been removed from the NanoStabilizer®-LT container (the digital scale reads: “**-110 g**”).
- Follow a similar procedure to accurately dispense **22 g** your cannabis extract into the pre-mix vessel.
- 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).

2

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

- Assemble the LSP-600 ultrasonic processor in the flow-through mode (see LSP-600 User Manual, LSP-600 Peripheral Equipment Assembly Guide and schematic on the right for details).
- Place the process vessel with a stir-bar on the digital scale and carefully dispense **880 g** of distilled water into the vessel.



- c. Place the process vessel onto the magnetic stirrer with hotplate. Attach the bottom outlet of the process vessel to the pump inlet using silicon tubing. The pump should send the liquid through the reactor chamber and then back to the top of the process vessel (see above schematic). To avoid foaming, make sure that the tube returning the liquid to the process vessel is submerged into the liquid by about 5 cm.
- d. Check that all connections in the process recirculation network are properly sealed. Check for any kinks in the tubing and make sure that any valves in the process recirculation network are sufficiently open for the process liquid to flow at a rate of 0.5 - 1.5 L/min.
- e. Turn the pump ON, then immediately OFF and check for any leaks in the process recirculation network. For assurance, preform this step several times. If no leaks are observed, proceed to the next step.
- f. Turn the pump ON and begin recirculating the water.
- g. Connect cooling water lines to the reactor chamber's temperature control jacket (see LSP-600 User Manual for details). Check for kinks or leaks in this line. Do not cool the reactor chamber yet (this will be done in Step 4b).

3

Mixing the oil phase with the aqueous phase in the process vessel:

- a. While the distilled water is flowing through the recirculation network and being stirred on the magnetic stirrer with hotplate, place the pre-mix vessel onto the digital scale and tear.
- b. Similarly to Step 2, use the negative reading on the digital scale to dispense exactly **120 g** of the oil phase from the pre-mix vessel into the process vessel.
- c. Leave the stirrer running until you finish Step 4d. Make sure not to introduce any air bubbles into the liquid by excessively vigorous stirring.

4

Ultrasonic Processing:

In this step, ultrasonic processing will commence. Refer to LSP-600 User Manual for operating instructions.

- a. Verify that the transducer is being cooled correctly, if necessary (see LSP-600 User Manual for details).
- b. Set the ultrasonic amplitude to 80% (see LSP-600 User Manual for details). Note that this setting can be adjusted up or down to optimize the results.

- c. Initiate ultrasound and start timing. Monitor the temperature of the process liquid and, when necessary, open the cooling line to the reactor chamber's cooling jacket to maintain the process liquid temperature at 45 – 60 °C (113 – 140 °F) throughout processing.
- d. Draw a sample into a 10 ml vial every 15 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 nanoemulsion to recirculate and cool for 10 minutes.

5

Filtration:

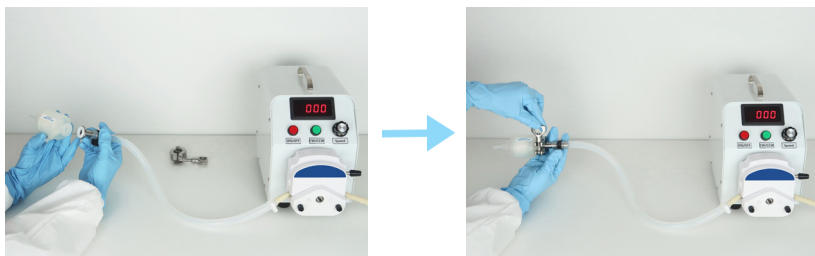
In this step, you will use the in-line sterilizing filter to remove any microorganisms and particulate contaminants from your nanoemulsion as you collect it in the finished product container.

PARTS NEEDED:



1. In-line sterilizing filter with 1/2" sanitary fitting
2. Peristaltic pump with 1/2" ID silicone hose
3. 1/2" sanitary to 1/2" hose ID adapter
4. Sanitary clamp
5. Sanitary gasket

- a.** Assemble items **1 - 5** as shown in the pictures below.



- b.** Using your pump at a flow rate of 100 - 150 ml/min, sterilize the nanoemulsion by passing it through the in-line filter into the pre-sterilized finished product container.



- c.** Store the finished product container with the filtered nanoemulsion in a cool and dark place.
- d.** Flush the filter with distilled water gently in both directions until the water runs clean.



Sonomechanics.com