

NANOSTABILIZER®-LT

USER GUIDE: WITH ISP-3000 PROCESSOR IN THE FLOW-THROUGH CONFIGURATION



Sonomechanics.com

MATERIALS NEEDED:

- ISP-3000 ultrasonic processor configured in the flow-through mode (see ISP-3000 User Manual for details);
- Digital scale, peristaltic pump, in-line sterilizing filter, 10 ml vials, disposable pipettes;
- 25 50 L storage tank with mixer and valved bottom outlet, overhead stirrer, heat exchanger, 5 8 L 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 25 kg (25 L) OF TRANSLUCENT NANOEMULSION:

The instructions below detail the method for preparing 25 kg (25 L) of 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	0.25 kg	0.50 kg	0.75 kg	1.00 kg	1.25 kg
NanoStabilizer®-LT	1.25 kg	2.50 kg	3.75 kg	5.00 kg	6.25 kg
Distilled water	23.5 kg	22.0 kg	20.5 kg	19.0 kg	17.5 kg
Total	25 kg				
Number of 10 mg doses per 25 L of nanoemulsion	25,000	50,000	75,000	100,000	125,000

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 when transferring to the storage tank with mixer (Step 3), some may remain in the pre-mix vessel (for future use). To accurately dispense **2.75** kg of the NanoStabilizer®-LT (**2.5** kg + **0.25** kg of excess) and **0.55** kg of the cannabis extract (**0.50** kg + **0.05** kg of excess), follow the directions below:

- **a.** Warm up NanoStabilizer^{*}-LT in its original container (e.g., using a microwave oven) until it softens. Do not exceed about 60 °C (140 °F).
- b. Place the NanoStabilizer[®]-LT container on the digital scale and tear. 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 (-2.75 kg in this case), dispense decreasingly smaller amounts. Continue this until 2.75 kg have been removed from the NanoStabilizer[®]-LT container (the digital scale reads: "-2.75 kg").
- **d.** Follow a similar procedure to accurately dispense **0.55** kg of your cannabis extract into the pre-mix vessel.
- e. Use the overhead stirrer at a low speed to mix the molten contents of the pre-mix vessel. Keep stirring 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).

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

- Assemble the ISP-3000 ultrasonic processor in the flow-through mode (see ISP-3000 User Manual and schematic on the right for details).
- **b.** Dispense **22** kg (22 L) of distilled water into the storage tank with mixer. Start the mixer.



- **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, then to the heat exchanger and back to the top of the storage tank with mixer (see ISP-3000 User Manual 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, preform this step several times. If no leaks are observed, proceed to the next step.
- **e.** Turn the pump ON and begin recirculating the water at the flow rate of 2 10 L/min.
- **f.** Connect cooling lines to the transducer's cooling jacket and to the heat exchanger (see ISP-3000 User Manual for details). Check for kinks or leaks in these lines. Do not turn on the water chiller yet.

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

- **a.** While the 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 **3.0** 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.



Ultrasonic Processing:

In this step, ultrasonic processing will commence. Refer to the ISP-3000 User Manual for operating instructions.

- **a.** Turn on the water chiller and verify that the transducer and the heat exchanger are being cooled correctly (see ISP-3000 User Manual for details).
- **b.** Set the ultrasonic amplitude to 80 % (see ISP-3000 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 lines if the processed liquid becomes too cold).
- **d.** After processing for 1 hour, 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 the ultrasound and allow the processed liquid to recirculate and cool for 15 minutes.

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:



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

NanoStabilizer®-LT User Guide: with ISP-3000 Processor in the Flow-through Configuration

a. Assemble items 1 - 5 as shown.



b. Using your pump at the flow rate setting of 250 - 300 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