



Figure S1. Images of the limonene nanoemulsion formed by various ratio of limonene and soybean oil: (a) 0% soybean oil, (b) 50% soybean oil, (c) 80% soybean oil, (d) 83% soybean oil and (e) 100% soybean oil. Red line indicates the phase separation in the sample.

Table S1. Limonene nanoemulsion size and polydispersity index (PDI) of number of pass and soybean oil content experiments.

Soybean oil content (%)	0 pass		1 pass		3 pass		5 pass	
	Droplet Size (nm)	PDI	Droplet Size (nm)	PDI	Droplet Size (nm)	PDI	Droplet Size (nm)	PDI
0	152.80±3.51	0.33±0.03	152.70±7.29	0.52±0.05	143.65±1.20	0.54±0.01	125.70±3.15	0.53±0.01
50	393.80±16.28	0.31±0.11	111.43±1.35	0.24±0.01	56.39±0.15	0.19±0.01	47.26±0.18	0.18±0.01
80	327.80±8.27	0.43±0.01	123.93±1.02	0.23±0.02	68.75±0.17	0.22±0.01	55.53±0.19	0.20±0.01
83	603.00±17.83	0.51±0.04	138.30±0.25	0.24±0.01	85.89±0.53	0.23±0.02	71.08±0.87	0.22±0.01
100	481.60±12.10	0.35±0.14	150.90±1.91	0.27±0.01	108.90±1.31	0.24±0.01	91.20±1.60	0.22±0.01

Table S2. Time-based observation of nanoemulsion average droplet size of 0% soybean oil sample.

Nanoemulsion Storage Time (days)	Droplet Average Diameter (nm)
0	125.70±5.00
7	158.80±6.85
14	195.80±5.03

Table S3. Viscosity of the materials used in this study.

Materials	η (25°C) (mPa.s)	η_D/η_C ^{a)}
DI Water	0.94	—
Soybean Oil	64.90	69.04
Limonene	0.59	0.63

a) η_D/η_C : viscosity ratio between dispersed phase and continuous phase. (Dispersed phase = soybean oil and limonene, continuous phase = DI water)

Table S4. Limonene nanoemulsion size and PDI of various synthesis method experiment.

Processing Method	Before Processing		After Processing	
	Droplet Size (nm)	PDI	Droplet Size (nm)	PDI
Ultrasonic^{a)}	392.73±6.40	0.49±0.01	327.30±9.31	0.45±0.01
HSH^{b)}	N/A	N/A	178.5±0.05	0.34±0.02
HPH^{c)}	390.85±7.21	0.47±0.10	77.30±1.01	0.23±0.01
HSH + HPH^{d)}	327.80±8.27	0.51±0.04	55.53±0.19	0.20±0.01

a) Ultrasonic was conducted at high frequency (40 kHz)

b) HSH was conducted by mixing coarse emulsion directly at 12,000 rpm for 30 min.

c) HPH was conducted directly without HSH at 1000 bar for 5 passes

d) HSH was conducted first for 5 min at 12,000 rpm and continued by HPH at 1000 bar for 5 passes.