Branson 450 Sonifier (PSC 545, 645, NSC 484)

Every time you use the Sonifier, you MUST sign the logbook.
When using the micro tips, do not advance the Output Control beyond 7 or permanent damage to the micro tips can result.
Turn all controls so that the knob tabs are vertical and pointing up.
Do not allow micro tips to touch anything other than the solution. The stress of touching the glass container can cause fracture of the tip or container.
When Sonicator on, keep tip immersed at all times in liquid.

Contact: Debby Walthall (404) 413-5363; dwalthall@gsu.edu

General information

1. Sonicator breaks cells using sound. The Sonifier is used to disrupt cells, bacteria, spores, or tissue.
2. Sonicator vs. French Press. French Press is more efficient and doesn't generate heat when breaking cells, but it has a minimum volume (500 ul). The Sonicator is also much easier to use when you have many samples. The Sonicator gives a sample in a water bath an even and consistent vibration. In other words, you can do multiple samples and hold the test tube the same distance from the sonicator tip for each sample and therefore get the same amount of cell breakage.
3. You have 2 choices when sonicating your samples –water (ice) bath or direct. Most labs use an ice bath -the agitation is less, but your sample stays cold and the breakage is more even and reproducible.
4. The Sonifier has 3 components; the power supply, the converter and the horn or water cup.
5. The Sonifier functions in 2 modes: Pulsed and continuous. Pulsed transmits the ultrasonic vibrations at a rate of 1 pulse/sec. And can be adjusted from 0.1 to 0.9/sec. This allows full ultrasonic intensity, while limiting temperature build-up. Continuous mode allows for continuous transmission of the ultrasonic vibrations.
6. Since the power supply is constant amplitude, it will adjust power depending upon the load that is needed. For example, if the horn is in air with minimum pressure and minimum power, minimum amplitude is needed. But once the horn is immersed in liquid, the more viscous the liquid, the higher the load and more power is needed.

Power Supply front panel

1. Timer – select 0 to 15 min. or Hold.
2. Duty Cycle Dial – In the Pulsed mode, the ultrasonics are pulsed at a fixed repetition rate of one pulse/sec. This control varies the duration of the ultrasonic pulse. For example, if you choose 10% setting, ultrasonics will be on for 10% of every sec. If you choose 90%, ultrasonics will be on for 90% of every second. **This is the control that you adjust the most**. You need to figure out for your experiment what % gives you the best breakage. **Hosam Ewis uses 50%.**
3. On/Off switch
4. Loading meter – indicates level of ultrasonic power delivered to your sample

5. Output control – Controls the amplitude. Clockwise rotation increases amplitude. **This is the control you MUST turn back to 0 when finished.**

Operation

1. The first thing to check on the machine is whether or not the Sonicator controls were left correctly by the last person. **All knobs should have the tabs vertical and pointing up. If they're not – please note in the logbook.**
2. You need to then make sure that the horn assembly components are tight. With use, the connections will vibrate loose. Use the 2 spanner wenches (look sort of like wenches, but they have a plug sticking out). These plugs fit into a notch on the horn assembly and work with opposing force (pull 1 wrench counterclockwise and the other clockwise). I don't know which way tightens and which loosens.
3. Inspect tip – a good tip is smooth and not pitted.
4. No glass beakers or test tubes – use polypropylene tubes. Do not use microfuge tubes (too thick). If you have a small amt. (~1- 2 ml), use a disposable transfer bulb. Suck up the sample and turn the bulb upside down so that the sample goes into the bulb. Hold bulb about 1/2 in the water bath. You can also do more than 1, just hold all the bulbs in your hand at the 1/2 way mark.
5. Time. For timed operation, set the timer to desired processing time. This is personal preference. It seems some labs use the timer and others use Hold and time it themselves. For Continuous operation, turn timer control fully clockwise to the Hold position.
6. With the tip of the horn immersed ~ 1/4 to 1/2 in. in the solution to be processed, turn power switch to ON. To increase ultrasonic intensity turn Output Control clockwise to 3 – 4 (this may vary depending on sample type and lab).
7. To operate in Pulsed Mode – set the Timer Control to hold if the process is not to be timed or select a time between 0 and 15 min. Set Duty Cycle Control to the required pulse duration (50%). The lower # setting, the shorter the pulse, and the slower will be the temperature rise of the solution. Switch power On and adjust Output Control to the required intensity (3 –4).
8. Watch the meter. The reading should be the same as you have set on Output Control.
9. When using the micro tips, do not advance the Output Control beyond 7 or permanent damage to the micro tips can result.
10. Do not allow micro tips to touch anything other than the solution. The stress of touching the glass container can cause fracture of the tip or container.
11. The Plastic cup/water bath setup is in NSC 528. Put ice in the plastic cup and your flask with your cells in the ice. The vibrations come through the hole in the bottom of the cup. There is also a drain hole (has a pipet bulb on end) if you need to drain H_2O from the cup as the ice melts.
12. **When finished, turn all knobs so that the tabs are vertical and pointing up.** Clean out cup if you used it.