

Energy Dissipation Study of Ultrasonic Bath to Identify Suitable Zone for Better Performance of the Bath †

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Abstract: The mapping of an ultrasonic bath was performed to identify a suitable zone for carrying out various processes effectively using the bath. The mapping of an ultrasonic bath was done with a PPB Megasonics instrument known as a cavitation meter. The cavitation meter measures the energy intensity (watt per square inch) and frequency of ultrasound. The experimental data helps in accurately placing the vessel in the bath for a better outcome. To obtain the average energy dissipation data throughout the bath, the study was carried out by varying the various process parameters such as location of the beaker (P1- P5), height of the beaker (10 - 40 mm), sonication power (110 W and 220 W), sonication frequency (20 – 40 kHz) and sonication bath temperature (35 – 50 °C). The energy dissipation value was recorded by placing the sensor inside the beaker at a fixed height and location. The experiments were performed by applying one factor a time method, and it was observed that the average maximum energy dissipation 52 (W/in²) for 210 min was obtained at a center position of bath (P5), beaker height 40 mm, power supplied 220 W, frequency 30 kHz, and bath temperature maintained at 35 °C.

Keywords: mapping; ultrasonic bath; cavitation meter; energy intensity; frequency.

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Conflicts of Interest

The authors declare no conflict of interest.