Mechanical and Ultrasonic (Sonication) Homogenizing

Problem: A critical component of any sample preparation is making the sample homogeneous. However, when working with a large number of samples, this is often a time-consuming and labor-intensive task. The act becomes even more tedious and cumbersome when one needs to break down a large, tough solid to a submicron level, since this requires multiple pieces of homogenizing equipment.

Solution: The DPS-20 Dual Processing System simplifies sample prep by combining mechanical and ultrasonic (sonication) homogenizing methods into an automated, closed, compact and timesaving unit. Its unique design allows the use of each homogenizing method dependently or independently of each other within a programmable or manual mode. The automation of this system allows for repeat processing and consistent results, which frees up a large amount of valuable lab time.

The DPS-20 has three homogenizing configurations: automated mechanical homogenizing, automated ultrasonic/sonication homogenizing, and dual homogenizing. Dual homogenizing mode leads to the most effective processing by merging the advantages of both mechanical and ultrasonic (sonication) homogenizing to create a faster and more efficient sample breakdown with minimal or no heat introduced. In this mode, samples are first homogenized mechanically and then homogenized ultrasonically. Mechanical homogenizing can break down a solid sample faster than ultrasonic (sonication) homogenizing, but it takes a longer time to reach the smallest of breakdown levels. The downside of ultrasonic (sonication) homogenizing alone is that it cannot break down large solids, rather samples must already be substantially physically broken down and then material can be reduced to a submicron level quickly. By combining mechanical homogenizing for the initial breakdown and following up with ultrasonic homogenizing, the DPS-20 cuts down on the processing time of using either method independently.

However, if one's specific sample preparation would not benefit from dual processing, but rather mechanical homogenizing or ultrasonic (sonication) homogenizing alone, then those methods can be used independently in an automated setup. By automating this process and setting a program for speed and time that can be stored on the DPS-20, users will achieve more consistent results compared to traditional non-automated homogenizing methods. There is zero operator variability.

▲ *PRO DPS-20 dual processing system.*

Another added benefit of the DPS-20 is that there is no need to alter or change the tube one will continue to use in their research. Whether processing in small microtubes or larger centrifuge tubes, the DPS-20 carousel racks can accommodate a variety of tubes from 1.5 to 50ml. Sample integrity is also maintained with a unique carousel rack design that incorporates a cooling tray. Trays can be easily filled with cooling beads or an ice bath when samples need to remain at sub-ambient temperatures.

▲ *Micro, small and large cooling carousel tube packages.*

High throughput is easily achieved using the DPS-20. With it, users can efficiently process up to 20 samples in one run, contained in a sound-abating enclosure with mounted LED interior lighting and a clear polycarbonate door for a full view inside. Laboratory productivity significantly increases when a typical run time for 20 samples is automated in mere minutes.

When cross-contamination is a concern, there is the option of no rinse, a single rinse per homogenizing method, or multi-rinse for every other tube position. A single rinse cycle refers to two positions on the DPS-20 carousel that are designated as cleaning rinses and the remaining 18 positions are for sample processing. A multi-rinse cycle refers to 10 positions on the DPS-20 carousel that are designated as cleaning rinses and the remaining 10 positions are for sample processing.

Research is constantly evolving and moving toward quicker and more efficient processing that can be replicated again and again. The DPS-20 dual processing system represents a significant advancement in the field of sample preparation.

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