Abstract

Acoustic Vibrations are applied for many different uses. These vibrations have been traditionally used for tissue imaging and as a therapeutic technology. Research labs are using these waves at low frequencies to be applied on cell-cultures to manipulate the mechanical properties of cells; other labs use them to improve scaffolding fabrication methods. Research has also been done using this method to test for cell viability, proliferation, and differentiation. There is no device on the market that is available to supply the needs of these researchers. We have developed a device that will vibrate a cell-culture medium at frequencies ranging from 20Hz-10kHz built into an incubator that controls and displays the temperature on an LCD screen. This is a new market that shows the same promise that light radiation and ultrasound technology began with.

Customer Needs

- Adjustable Frequency (20 Hz- 10 kHz)
- Adjustable Amplitude
- Adjustable Time duration and repeatability
- Portable Incubator Enclosed System with housing for petri dish.
- Controllable Enclosed Temperature.
- AC Powered.
- Accelerometer attached to petri to measure actual frequency within petri dish

Test Results

We conducted various tests to ensure our device worked efficiently. Our main test plans were the Temperature Control Test, and Accelerometer Test.

The entire system was powered. As the heat circulated in the incubator a thermometer was placed next to the temperature sensor. After 3 seconds delay there was a difference of .5 degrees between the thermometer and the sensor. Thus our temperature sensor passed with accuracy difference of +-.5°C

The Accelerometer was applied to read data on the speaker. This was the source of the wave emission. A 20Hz frequency was detected. The frequency applied was 20Hz thus the system passed.

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References