Serum Inactivation in Bead Baths

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Symptoms

Serum media bottles take longer to bring to temperature in Lab Armor Beads than in a standard water bath. In direct comparison to water, it takes Beads approximately 2-3x longer to warm a 500 ml media bottle. To troubleshoot these issues, follow the recommendations below.

Problem
Due to its greater thermal mass, Beads take longer to warm than water. When a cold vessel is placed into Beads, like water, it cools slightly then returns to temperature as it brings the vessel to temperature. Both the temperature drop and the rate of return to temperature depend on several factors related to (1) the volume and the original temperature of the vessel, (2) the amount of Beads contained within the bath, (3) the set instrument temperature, and (4) the thermal efficiency of the bath.

It is known that prolonged treatment of the serum at elevated temperatures will cause deterioration of serum components critical for growth of cells. So it's critical to adjust a water bath protocol for use with Bead Baths.

Products Affected: Use of Lab Armor Bead Baths for Inactivation of Serum

Resolution

To be sure that serum inactivation is as successful in a Bead Bath as it is when using any current water bath protocol, it is important to note the exact incubation time/temp of the current water bath protocol and reproduce it in the Bead Bath. You'll need to know exactly how long you typically incubate the 500 ml bottle once it reaches the set temp. You may need to run a quick test to determine that time period (see the suggested test protocol below). You'll also need to know how long it takes the 500 ml bottle to reach the set temp in a Bead Bath.

If you don't know when your bottle actually reaches the set temp or how long it actually incubates at the set temp when using your protocol, I would recommend that you run a quick experiment similar to the following:

1. In a water bath, perform your inactivation protocol as usual, but use a 500 ml serum bottle filled with water
2. Place a thermometer into the bottle to measure the water temp
3. Incubate the bottle according to your normal protocol

4. Monitor when the water reaches the set temp, say 56C, and record incubation period at the set temp
5. Set a Bead Bath to the same set temp (56C), and allow it to equilibrate overnight. Otherwise follow the 30 min quick set-up method in the Lab Armor Beads Manual.
6. Bring the 500 ml bottle to the set temp (56C) and record the length of time it took to reach the set temp (time-to-temp)
7. Adjust your protocol to reflect the new time-to-temp and incubation period