The Effect of Varying Concentrations of B. atrophaeus on the Prevacuum Steam Sterilization Resistance of Dual Microbe Biological Indicators Consisting of G. stearothermophilus and B. atrophaeus

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Biological Indicators (BIs) are used to determine if the sterilization cycle was successful. The most important property of these BIs is the resistance to sterilization. Basic BIs have one microbe in them making it easy to understand how sterilization effects. Dual microbe BIs have two microbes allowing use in multiple forms of sterilization. This second microbe may act as a biological shield and protect the primary microbe from sterilization. If the resistance increases, time and resources will be wasted in an attempt to sterilize the BI. The hypothesis of this paper is that an increase in the secondary microbe concentration will increase the resistance of BIs and that a difference in the resistances can be found when the secondary microbe concentration is the same as the primary microbe concentration. To accomplish this, six dual stock suspensions of G. stearothermophilus and B. atrophaeus with constant concentrations of G. stearothermophilus and varying concentrations of B. atrophaeus were made. Each dual spore suspension was used to inoculate disks. The disks were put in BIER vessels at varying exposure times and the data was used to calculate the D-values, a measure of the resistance of a BI. A regression test showed a positive correlation between the secondary microbe concentration and the resistance of the BI. The difference of means test showed that even when the ratio of the secondary microbe to the primary microbe is 1:100, there is a change in the overall resistance of the BI. Both of these conclusions support the hypothesis that an increase in the secondary microbe concentration will increase the resistance of BIs and that a difference in the resistances can be found when the secondary microbe concentration is the same as the primary microbe concentration.

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