Efficacy of Bacteriophage P1 Therapy versus 1,3-Dibromo-5,5-Dimethylhydantoin on Pathogenic Bacteria in Cow Skeletal Muscle

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This investigation studied the potential effectiveness of bacteriophage P1 therapy, in comparison to 1,3-Dibromo-5,5-Dimethylhydantoin (DBDMH) on Escherichia Coli in cow skeletal muscle. The motivation for this project was born due to the excessive amount of illnesses, hospitalizations, and deaths caused by pathogenic bacteria in meat. Worldwide, over 300 million people fall ill and over 150,000 people die per year due to Escherichia Coli O157:H7 infections from contaminated meat, in spite of treatment from biocides such as DBDMH. Additionally, due to the overuse of biocides and antibiotics, many strains of bacteria become resistant to them. However, bacteriophages are naturally occurring viruses that can kill bacteria. Moreover, as bacteria mutate to become resistant, phages can also mutate to overcome the resistance. The hypothesis was: If bacteriophage P1 therapy and 1,3-Dibromo-5,5-Dimethylhydantoin biocide is used against Escherichia Coli in cow skeletal muscle, then bacteriophage P1 therapy will be most effective. To test this hypothesis, a P1 phage cocktail and a DBDMH solution was sprayed on 100 cm2 pieces of brisket that was inoculated with Escherichia Coli. The brisket that was sprayed was then homogenized with peptone water and sodium citrate, diluted, and then placed on Petrifilm. The Petrifilm was incubated at 37° Celsius for 24 hours, and a colony count was taken as quantitative data. This experiment yielded results showing that bacteriophage P1 therapy is more effective in stopping the growth of Escherichia Coli on cow skeletal muscle than the commercial biocide 1,3-Dibromo-5,5-Dimethylhydantoin.

Awards Won: