Abstract

Creative Project: Bacteriophage control of *Salmonella enterica* in artificially contaminated pasteurized milk.

Student: Victoria Blake

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College: Sciences and Humanities

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Salmonella bacteria consists of two species and six subspecies with over 2,500 serovars. The two species that are acknowledged are *Salmonella enterica* and *Salmonella bongori*. *Salmonella* can be found in many different places, such as the intestinal tract of humans and animals, water ways, milk, and soil, to name a few. In the United States, *Salmonella* is the number one foodborne pathogen commonly found in poultry, beef, eggs, and milk (1). Eating food contaminated with *Salmonella* can cause Salmonellosis which is estimated to affect 1.2 million people a year (4). It is characterized by severe diarrhea, fever and abdominal cramps that usually last 4 to 7 days. *Salmonella* is known to be found in the farm environment, ranging from 10 to 26% (2). Among scientists, bacteriophage has been examined as a possible biological control of *Salmonella* contamination in food products. Bacteriophage, also known simply as phage, are bacterial viruses. They are host specific meaning they only infect one species of bacteria and it is thought that there are around 10^{31} phage on Earth. Phage contain lytic proteins that have the potential to control the growth and spread of bacteria. This is an interest to many scientists because this could become an alternative to antibiotics. Although there is much potential for phage, their use in the dairy industry, among many others, has not been well

explored. *Salmonella* have been observed surviving in temperatures as low as 2°C and as high as 54°C. Since milk is pasteurized at around 62.8°C there is slight room for this bacterium to possibly survivie pasteurization. *Salmonella* can be easily transferred from raw milk to humans because according to McGuirk and Peak (3), cows can shed 102 and 105 *Salmonella* bacterium per mL of milk. The goal of this study is to use bacteriophage isolated from raw milk as a biological control of artificially contaminated milk with *S. enterica* and *S1*, an unknown *Salmonella spp*. found from raw milk taken from the same farm. First, raw milk samples were obtained and screened for the presence of any *Salmonella spp*. bacterium using Salmonella-Shigella (SS) Agar. Isolation of a single *Salmonella spp*. colony was obtained and purified. Also, from the raw milk, bacteriophage was isolated, and enriched using *Salmonella enterica*. *Salmonella enterica* is used as the positive control of the experiment. The bacteriophage are used as the biological control of artificial contaminated milk. Recovery of Salmonella after treatment was measured by SPC (standard plate count). The resulting data will be assessed using ANOVA and considered statistically significant if the obtained *p*-value is less than 0.05. We hypothesize that bacteria isolated from a natural environment will be more susceptible to bacteriophage infection than laboratory bought samples.