



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Kaitlin A. Kaufmann	Project Number J1319
Project Title Is the Temperature of Inactivation Different for Each Type of Phage?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine if temperature of inactivation is different for each type of bacteriophage. I believe this could be used as an easy field test to identify phage from field samples.</p> <p>Methods/Materials Dr. Cynthia Eayre, Research Plant Pathologist for USDA-ARS, and University of California, Davis provided phage samples. Crown Gall Bacteria (<i>Agrobacterium</i> spp.) was cultured by Dr. Eayre for my host. Research for a biological control for this economically harmful bacteria is being conducted due to the phase out of the soil fumigant Methyl Bromide. 40 phage samples have been screened for activity on <i>Agrobacterium</i>, but have not been specifically identified or classified. I used 4 of these with proven activity on the host. I prepared plates with pseudomonas agar, then a plaque of the host in a sloppy agar. I used a heat block to heat the 4 phage in water. Using a pipette I applied drops of phage onto the prepared plates starting at 30°C and repeating at 5° increments. Each replication was a series of 5 temps (spread of 25°) and a control. 24-48 hours later I evaluated the results of the control of the bacteria. I repeated the process, increasing the temp range until all 4 phage inactivated. I repeated the inactivation levels a second time to confirm</p> <p>Results Each phage was repeatedly tested by Dr. Eayre for activity on <i>Agrobacterium</i>. By testing the activity on this host until a temperature was achieved with no activity I was able to determine the temperature of inactivation. The results show a different temperature for each phage used. Phage 1 unstable at 70°C and inactivated at 75°C; Phage 2 unstable at 50°C and inactivated at 70°C; Phage 3 unstable at 80°C with inactivation at 90°C; Phage 4 unstable at 85°C with activity still present above 95°C.</p> <p>Conclusions/Discussion Each phage sample did have a different temperature threshold. These tests supported my hypothesis of a different temperature of inactivation for each type of phage. Further identifying the phage through traditional methods will provide confirmation of my results. This test can be a very valuable tool in the bacteriophage work being done in many disciplines of research. A fast, inexpensive test to identify phage in field samples could provide valuable information early in work to being done to find cures for diseases around the world.</p>	
Summary Statement To see if temperature of inactivation can be used to identify bacteriophage.	
Help Received Used lab facilities at USDA-ARS Research Station under the supervision of Dr. Cynthia Eayre.	