



# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

<b>Name(s)</b> <b>Kaitlin A. Kaufmann</b>	<b>Project Number</b>  22409
<b>Project Title</b> <b>Is the Temperature of Inactivation Different for Each Type of Phage?</b>	
<b>Objectives/Goals</b> 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. <b>Abstract</b> <b>Methods/Materials</b> 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 mt 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 <b>Results</b> 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. <b>Conclusions/Discussion</b> 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.	
<b>Summary Statement</b> To see if temperature of inactivation can be used to identify bacteriophage.	
<b>Help Received</b> Used lab facilities at USDA-ARS Research Station under the supervision of Dr. Cynthia Eayre.	