



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Alyssa B. Gehlmann	Project Number J1507
Project Title Bacteria in Milk, Less Is Best	
Objectives/Goals The objective is to determine which type of milk has the most bacteria; soy, pasteurized, or raw. I think raw milk has the most bacteria, then pasteurized milk and soy milk.	
Abstract Each type of milk was poured into two test tubes, one as the control, the other the test sample with methylene blue added. The milk in the test tubes was heated to 98 degrees Fahrenheit and maintained at that temperature for eight hours. The heat was then turned off and the milk in the test tubes was allowed to cool to room temperature. From the start of the heating of the milk in the test tubes, the test tubes were examined every fifteen minutes for two hours, and then every hour up to nine hours of elapsed time. After 9 more hours, the test tubes were examined every hour up to 26 hours of elapsed time. The observations were recorded as they were observed.	
Methods/Materials Each type of milk was poured into two test tubes, one as the control, the other the test sample with methylene blue added. The milk in the test tubes was heated to 98 degrees Fahrenheit and maintained at that temperature for eight hours. The heat was then turned off and the milk in the test tubes was allowed to cool to room temperature. From the start of the heating of the milk in the test tubes, the test tubes were examined every fifteen minutes for two hours, and then every hour up to nine hours of elapsed time. After 9 more hours, the test tubes were examined every hour up to 26 hours of elapsed time. The observations were recorded as they were observed.	
Results The raw milk began to change when 1/2 hour to 3 hours had elapsed, and had the most significant change after the heat was turned off. The pasteurized milk began to change after 1-4 hours, and displayed some change. The soy milk did not change until after 6 hours had elapsed, and did not change much over the 26 hour time frame of the experiment.	
Conclusions/Discussion My hypothesis was correct; the raw milk had the most bacteria, then the pasteurized milk. The soy milk had the least amount. The soy milk had the least bacteria because it is made from soybeans. Pasteurized milk and raw milk are from cows, and cows develop more diseases because they are living animals. The pasteurized milk goes through a pasteurization process which kills much of the bacteria in it. The raw milk does not receive any special treatment. Bacteria grow best between 80 degrees and 98 degrees Fahrenheit. This explains why the raw milk had the most significant bacteria growth as it cooled from 98 degrees to room temperature (about 70 degrees Fahrenheit). People need to know how to store milk and when it is safe to consume it. If a person is concerned about bacteria content it is helpful to be aware of the bacteria content between the different types of milk.	
Summary Statement The comparison of the growth of bacteria in three types of milk; soy, pasteurized and raw.	
Help Received father helped supervise and obtain materials, mother took pictures, teachers helped stay on track, help with editing report, and designing graph.	