



# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

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<b>Project Title</b> Bacterial and Enzymatic Soft Rot on Vegetables	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The first part of my project is to determine what causes soft rot on vegetables and which bacteria is the most destructive to the cell walls of the vegetables. <i>Erwinia carotovora</i> subsp. <i>carotovora</i> will cause the most damage compared to <i>Pseudomonas</i>. The second part was to study the effect of the pectic enzyme without the presence of bacteria and to see if the pectic enzyme is active. I believe that maceration will occur the quickest in the solution containing the pectic enzyme. For the Viscosity test, autoclaved solutions will travel the slowest.</p> <p><b>Methods/Materials</b> I had grown bacteria from rotting a cucumber and green pepper. Then, used these three bacteria to test for soft rot by inoculating each of the sterile vegetables and leaving one each of the vegetables uninoculated with bacteria to serve as a control. The bacteria that used were <i>Erwinia</i> (grown from cucumber) at <i>Pseudomonas</i> (two, grown from green pepper). The vegetables that I used were white potatoes, Chinese cabbages, and baby carrots. I made Sodium polygalacturonate nutrient broth without glucose to determine which one of the bacteria was <i>Erwinia</i>. Then, I did the Maceration Test using 1mm slices from potato cores and placing one slice into five solutions and checking it every 15 min. with a sterile toothpick. The five solutions were 1ml of: live broth, autoclaved live broth, filtered broth fresh polygalacturonase, and autoclaved polygalacturonate. For the Viscosity Test, I used sterile Pasteur pipets to measure the time it took from the first line to the second line.</p> <p><b>Results</b> <i>Erwinia</i> did cause the most damage to the cell walls of the vegetables. The solution containing the pectic enzyme did break down the quickest and the solutions that were autoclaved didn't macerate at all. This also proves that the enzyme is active. The solution containing the pectic enzyme had the fastest flow rate and the ones that were autoclaved traveled the slowest.</p> <p><b>Conclusions/Discussion</b> <i>Erwinia</i> usually contains the pectic enzymes in the vegetables, where in most cases, <i>Pseudomonas</i> doesn't. The solution containing the pectic enzyme made the potato slices macerate the fastest because enzymes are used to speed up the process of breaking down the cell walls, causing it to rot faster. No soft rot occurred in autoclaved solution because the enzymes were denatured while being autoclaved. This is the same reason for the Viscosity Test.</p>	
<b>Summary Statement</b> My project is about soft rot occurring in vegetables.	
<b>Help Received</b> My teacher had supervised me while I was doing my project in class at Bravo High School; parents bought the bread.	