



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Megan D. Nicponski</b>	<b>Project Number</b> <b>S0422</b>
<b>Project Title</b> <b>Self-Medicating Plants</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project was to determine if plants would produce salicylic acid in response to stress.</p> <p><b>Methods/Materials</b> Plants were grown for testing and stressed with fungus and physical damage, then frozen using liquid nitrogen prior to being ground into powder. Salicylic acid was extracted with a mixture of ethanol and acetic acid, then sonicated to further break down the cell structure to release the chemicals.</p> <p>The samples were subjected to a ferric chloride test. If salicylic acid was present, there would be a purple color change. Calibration testing indicated the ferric chloride test method could only detect salicylic acid at levels down to 0.0001 molar concentrations. As a result, to determine if a control or a stressed sample had more salicyclic acid than the other, a know concentration solution of salicylic acid was added to both the control and test samples in equal and known amounts until a color change was observed in one of them. The first one to change color would, therefore, contain more salicylic acid.</p> <p><b>Results</b> The testing showed more salicylic acid present in the infected and physically wounded plants than in the control plants in all cases. The test method didn't yield an exact quantity of salicylic acid present in the plant material.</p> <p><b>Conclusions/Discussion</b> More advanced methods of measurement are required to determine exact quantities of salicylic acid produced.</p> <p>The Ferric Chloride test was not sensitive enough to directly detect the low levels of salicylic acid present, but as equal amounts of salicylic acid was added to each sample the test did allow a determination of which sample reacted first. As a result, the first sample to react contained the most salicylic acid.</p> <p>Since it took a relatively small amount of additional salicylic acid to cause a reaction to the ferric chloride, the amount of acid already present in the stressed samples was higher than expected. More advanced methods of measurement are required to determine exact quantities of salicylic acid present.</p> <p>The use of the Salicylic acid in plants is not know from this experiment just as we don't really understand how aspirin works in people, but it is definitely present when the plants are stressed. By looking for the presence of salicylic acid we may be able to determine when plants are stressed. This may allow human intervention to assist the plants. This would be very important for food crops resulting in higher yields and possibility a better quality product.</p>	
<b>Summary Statement</b> This project was conducted to prove that plants will produce salicylic acid in response to stress.	
<b>Help Received</b> Dr.T.Eulgem, Asst.Prof. Plant Cell Biology, UCR, reviewed experimental design; M.Schroeder, Lab Specialist, UCR, main contact at UCR for lab time; Dr. Milner, Chairman, Dept. of Chemistry, Cal Poly Pomona, reviewed experimental design; Father, transportation & guidance; Sister, artwork; L.Rose,	