



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Sophia P. Hussman	Project Number J0504
Project Title Testing the Effect of Marinade Acidity on Beef	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study is to determine whether varying the level of acidity in a steak marinade will affect the tenderness of a boneless beef top sirloin cap steak.</p> <p>Methods/Materials Two marinades (one with 1/2 the amount of acid to oil and one with the same amount of acid to oil), pH probe, beef samples, Warner-Bratzler Shear Force Machine, and a 1/2 inch corer. The meat was marinated and cooked, then cored and placed in the Warner-Bratzler Shear Force Machine for testing. This machine replicates the bite force needed to bite through a piece of steak.</p> <p>Results Two marinated steaks and one control steak were cooked and then measured in the Warner-Bratzler Shear Force Machine. The steak marinated in more acid proved to be more tender, but the control steak was more tender than both the treated steaks.</p> <p>Conclusions/Discussion The steak marinated in more acid proved to be more tender indicating the helpfulness of acid in the marination process, ultimately giving the consumer a more enjoyable experience. Although the untreated steak was more tender than the treated steaks, the speculation is that each steak was possibly altered due to feeding history, environmental history, and enzymatic tenderization. Each steak was the same cut but most likely from different cows. It is concluded that the marinade containing more acid was more successful but natural factors affected the outcome of the experiment.</p>	
Summary Statement I tested the effect of two marinades with different levels of acidity on meat by measuring it's tenderness using the Warner-Bratzler Shear Force Machine.	
Help Received I created two marinades with different acidity levels. I also marinated, prepared, and cooked the beef. Dr. Phil Bass from Certified Angus Beef Inc. educated and lent me the Warner-Bratzler Machine. Gavin Hertz from Newport Meat advised me and oversaw my use of the Warner-Bratzler Machine.	