The purpose of this investigation was to compare the amount of bacteria on plain, raw food and on raw food marinated with apple cider vinegar. I hypothesized that if foods were marinated with vinegar, then the amount of bacteria would be less than the plain food. The experiment involved testing the bacteria on tomatoes, lettuce, chicken, and fish. First, I tested the food plain, then after it had marinated in apple cider vinegar for one hour. Three trials were performed for each food, and the same sample was tested plain, and then with the vinegar. After 48 hours in an incubator, the bacterial colonies were evaluated. The data collected overall supported the original hypothesis. The lowest average number of bacterial colonies with no vinegar was the tomatoes with zero colonies, and the highest average was over one hundred thousand colonies on the lettuce. The lowest average number of bacterial colonies with vinegar was the tomatoes with zero, and the lettuce with seventy thousand. The general pattern of the data showed that the average number of bacterial colonies for food treated with vinegar was 12.97 thousand, and the average number of bacterial colonies for plain, untreated food was 27.08 thousand, reducing the bacteria by more than half by adding vinegar. These findings lead me to believe that food is safer to eat after being covered in apple cider vinegar because the average amount of bacteria on marinated foods was less than half of the average amount of bacteria on plain food.