



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Nathan H. Kandung	Project Number J1318
Project Title Koch's Postulate: Orange Ya' Glad We Have Penicillin?	
Abstract Objectives/Goals The purpose of my science project was to see if different fruit grew the mould of penicillin different, using the method designed by Robert Koch. The reason I did this was because I was interested to see if a disease was carried by different hosts, if it would mutate or adapt to better fit the environment. Methods/Materials Materials:6 oranges, 3 lemons,3 limes, 1 vile of penicillin, pitri dishes, agar, toothpicks, cotton swabs, bags, twist ties Procedures: 1.Make a wound on two of the oranges; 2.Using a cotton swab, infect those two oranges with the penicillin mould from the vile. This will be called series 1; 3.Wait four days and record observations of infected fruit; 4.With a cotton swab, apply some of the mould from the oranges on a pitri dish; 5.Wait two days and observe the pitri dish; 6.Repeat step two using the mould from the pitri dish with two oranges, two lemons and two limes. This will be called series 2; 7.Wait two days and observe infected fruit; 8.Using the fruit you infected two days ago, repeat step four ; 9.Two days later, observe pitri dish, and compare two first pitri dish. Results I found that when penicillin grew on different fruits, the colonies looked about the same, but the amount of mould was the main thing that varied. I found that when you grew mould on oranges, it grew more mould than limes, and the limes grew more than the lemons. I also experimented of sprayed fruit. The lemons colonies shot up higher than any other fruit. Limes grew the second most, and the oranges grew the least. Conclusions/Discussion The fruits all grew the mould differently. This told me that the chemical composition must be different in all of these fruits, and that is why the penicillin grew differently. Almost all of the sprayed fruit did not grow mould well. However, the lemon grew the mould better when it was sprayed. The explanation I could think of for this was that the pesticides reacted with the lemons chemical properties to turn it into an ideal habitat for mould to grow. This proved that pesticides could stunt growth. If the orange and the human body reacted the same way, pesticides might be able to fight off diseases or they might also kill the bacteria that our body needs to survive. The lime showed a decrease in colonies, but the mould covered .5% larger area. I maybe the mould that did manage to survive had less competition, so it was able to make the individual colonies bigger.	
Summary Statement The effects of different environments on a pathogen.	
Help Received Mr, Pembleton, for helping me get the penicillin.	