



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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Project Title
Effect of Various Concentrations of Glucose in Solutions on the Oral pH of Humans and Does Genetics Affect the Outcome?

Abstract

Objectives/Goals
To find a threshold concentration of glucose in a solution under which it has no effect on oral pH. To find if genetics can affect how prone one is to tooth decay

Methods/Materials
-----Material----- 16 Families; 50 people; pH strips with 0-14 level range; 100 ml of water; as much glucose as needed; graduated cylinder; measuring cup
-----Procedures----- Give your test subject water with concentrations of glucose at 10%-90%. Ask your test subject to rinse their mouth with the solution and wait for approx. 2 minutes. Make them spit it out into a sink and now, take the oral pH level of your subject and record your result. Also, record which family the test subject is a member of, if any. Repeat steps 3-8 with the different "glucose-concentrated" solutions (25%, 33%, 50%, 65%, 75%, 85%, and 90%. Be sure to make them with water thoroughly so no glucose from a previous test is left in their mouth, which might affect the results of the next test. For the family members, who are all brothers and sisters, also analyze the condition of their teeth and find out how many fillings they have.

Results
The threshold concentration of glucose in a glucose mouthwash is 50%, under which there is no effect on the oral pH level of humans. Also, I found out that after consuming a glucose concentration of 90%, 60% of the test subjects were at a medium degree of proneness, or a 50% chance of tooth decay. Each family and its family members had a unique pattern of reactions to glucose, while there was no consistency amongst random individuals or among families.
Also, I found out that the few Asian families all were less prone to tooth decay than the other American families because their normal pH level was higher than others and their pH levels never dropped lower than 6.5, almost a normal level.

Conclusions/Discussion
Also, now that people know that an 85% or 90% glucose solution can increase the chances of tooth decay, I think people should find out what the glucose concentration of their mouthwash is. If it is higher than 75% then perhaps they should stop using it in order to decrease their chances of a cavity. Finally, now that we know that there is probably a chance that genetics has something to do with people being more prone to tooth decay than others, people can stop blaming themselves for getting cavities and not brushing.

Summary Statement
The effect of different concentrations of glucose in a solution on the oral pH of a human and can genetics determine how prone one is to tooth decay?

Help Received
Mother helped make solutions