



CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY

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| <b>Name(s)</b><br>Nitya P. Mehrotra-Venkat   | <b>Project Number</b><br><br>34918 |
| <b>Project Title</b><br><b>The Effect of Natural Sweeteners and Herbal Remedies on Alleviating Hyperglycemia in Type 2 Diabetes</b>  |                                    |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>         The foremost goal of this project was to help diabetics keep low glucose levels without any medicines. Two different diet-related strategies were explored for this purpose: using alternative sweeteners to replace ordinary sugars and using different plants and herbs that are widely used to lower high blood glucose.</p> <p><b>Methods/Materials</b><br/>         In vitro testing with 11 natural sweeteners and 6 herbal remedies were done to find their glucose levels. After that, in vivo testing of two herbal remedies was done and, after that, interviews with diabetics were done.</p> <p><b>Results</b><br/>         The in vitro testing of the assorted solutions with invertase (an enzyme to accelerate hydrolysis) yielded interesting results. Pure fructose crystals had the lowest glucose level but were found unsafe due to possible side effects in other research; however Erythritol (a bark sugar) presented low glucose levels was found to be safer. The two natural remedies that worked the best among those tested were fenugreek and okra#human and animal testing conducted in other research indicated similar results. The results of the in vivo testing were that both fenugreek and okra had an impact on one of the subjects, but not the other. Interviews with diabetics were done to figure out how effective and common herbal remedies were in diabetics, without asking for data. It was found that most diabetics interviewed saw a reduction in blood glucose.</p> <p><b>Conclusions/Discussion</b><br/>         Major findings of the study includes (a) different sweeteners have different levels of glucose-- fructose crystals have the least amount of glucose of sweeteners tested while monk fruit and stevia crystals contain a significantly higher amount of glucose and (b) herbal remedies do indeed lower the glucose levels with fenugreek powder and the okra fruit being the most effective. The experiments indicated a correlation between the effectiveness of the herbal remedy and the amount of fiber in the remedy, as exhibited by the level of solidification of the mixture over 24 hours. The higher the fiber in the remedy was, the more effective it was. (c) herbal remedies have an impact on diabetic patients more than non-diabetic patients and therefore may be safe to eat, as they will not cause hyperglycemia</p> |                                    |
| <b>Summary Statement</b><br>This project explores two different ways that diabetics may possibly be able to use to lower blood glucose.  |                                    |
| <b>Help Received</b><br>Neighbor was my mentor and gave me advice; My teacher gave me advice; Mom helped me design backboard and helped type report.   |                                    |