CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J0404

Project Title
The Process of Fermentation

Abstract

Objectives/Goals
The objective of this project is to determine if different varieties of sugar affect the amounts of carbon dioxide to be released during the process of fermentation. The hypothesis is that brown sugar, raw sugar, and sugar substitute, will have the same effect on the carbon dioxide production as white sugar.

Methods/Materials
The ingredients, sugar, yeast, flour, and salt, are mixed together. All sugars are used for three trials. Heated water is added to the mixture. After that, flour is added to make the liquid mixture pull away from the sides of the bowl and turn into a soft dough. The resulting dough must be kneaded for about five minutes. The dough then is placed into a container for rising. The amount has to be equal for all the trials. After that, the dough is put into the oven, that had been preheated to 300 degrees F, then turned off, to rise for 45 minutes. The height of it is recorded. This process is repeated three times, then the average of the heights is determined and recorded. The above procedure is repeated for brown sugar, raw sugar, and sugar substitute.

Results
After two of the trials for the white sugar were finished, the salt was forgotten to be put into the mixture. Also, the plastic melted, so that trial had to be done over. It was also determined that in order for the dough not to stick, the container must be greased thoroughly with vegetable oil. After all the trials were done, I took the averages of all the sugars, and I concluded that the brown sugar mixture, which had an average height of 18 centimeters, had risen the most and had the most carbon dioxide production. The white sugar had an average height of only 15.5 centimeters, the raw sugar had an average height of 17.5, and came close to the brown sugar, and the sugar substitute had an average growth of 10.5 centimeters. Therefore, brown sugar is the best sugar to use during fermentation.

Conclusions/Discussion
The hypothesis was rejected by the data. The hypothesis was that the type of sugar used would not affect the amount of carbon dioxide produced during yeast fermentation. But the brown sugar actually caused the dough to rise more, an average of 18 centimeters. The brown sugar is the sweetest and has the most glucose in it, according to the ingredients, and because of that, more food is provided for the yeast, which causes the dough to rise more. Breadmakers could use brown sugar for their bread, since the dough rises more.

Summary Statement
My project is about determining which of four sugars produces the most carbon dioxide during the fermentation process.

Help Received
My parents helped edit my writing, brainstorm ideas, do research, and supervised the experiment. My science teacher, Ms. Fisher, also helped edit my work and gave me tips for my board. My language teacher, Ms. Valle, helped me edit my research report.