



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Beth E. Buchanan; Emily E. Pofahl</b>	<b>Project Number</b>  31118
<b>Project Title</b> <b>Going Green to Prevent Green: Do Natural Preservatives Prevent Mold in Bread?</b>	
<b>Objectives/Goals</b> To determine how well natural preservatives delay the initial appearance and growth of mold on white bread when stored in the dark or when stored in the light. <b>Abstract</b> <b>Methods/Materials</b> Design: We had 4 different natural preservatives and a control condition. We had 2 storage conditions (light and dark). Procedure: 1. We made our 5 loaves of white bread in bread makers (water, butter, salt, sugar, white bread flour, non-fat dry milk, and active dry yeast) so we could control the base ingredients. 2. We added 1 of the 4 preservatives [Stat-N-Plus (made from Rosemary, Ascorbic Acid, Buttermilk, and Ginger) to 4 loaves and added no preservative to the 5th loaf (control condition). 3. We made 8 samples from each loaf for a total of 40 samples (80 grams each). 4. We put the 40 samples in sealable plastic bags and stored 4 samples of each preservative condition on the kitchen counter (light condition) and 4 samples in a brown paper bag (dark condition) 5. We checked the samples daily through a magnifying stool for the initial appearance of any mold. Once mold appeared we carefully measured the mold area (mm <sup>2</sup> ) with a metric ruler for 3 days. <b>Results</b> Overall bread made with the natural preservatives actually did worse than the control bread. Bread made with the natural preservatives had mold appear earlier and grow mold more quickly than the control. The only preservative that did delay the initial appearance of mold was buttermilk, but once the mold appeared on the buttermilk samples, it grew more quickly than the other preservatives. We also found bread made with the natural preservatives grew mold more quickly in the light conditions than in the dark conditions. <b>Conclusions/Discussion</b> Overall, our findings suggest the natural preservatives do not prevent mold. We were surprised to find only the buttermilk preservative delayed the initial appearance of mold and all of the preservatives grew mold more quickly than the control. This means we did not find support for claims made in the written literature that these natural preservatives prevent the appearance of mold. Our findings also suggest that bread made with these preservatives grow mold more quickly when stored in the light. We were surprised that the mold appeared earlier when stored in the light for most of the preservatives and grew more quickly in the light for all of the preservatives. Again, this is not consistent with the written research.	
<b>Summary Statement</b> This project examined the effectiveness of four natural preservatives (Stat-n-Plus, Ascorbic Acid, Buttermilk, and Ginger) and two storage conditions (light vs. dark) in delaying mold appearance and inhibiting its growth on white bread.	
<b>Help Received</b> A family friend helped us locate the natural preservatives.	