



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Samantha M. Guhan	Project Number J0405
Project Title A Behind the Scenes Look at the Idli Fermentation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Idli, a popular Indian snack, is a steamed rice cake made from a fermented batter containing ground parboiled rice and lentil. I became curious when I realized that a fermentation was occurring without adding any live cultures to the batter. My first goal was to determine what is responsible for the fermentation. The quality of idli varies widely in taste, flavor and texture; my second goal was to try different ratios of rice to lentil found in recipes to determine which worked the best and why. The third goal was to investigate the truth in the claim that adding fenugreek improves product quality.</p> <p>Methods/Materials I performed fermentations using three ratios of rice to lentil, namely 1:1, 2:1, and 3:1, both with and without fenugreek. I followed the fermentation over time by taking batter samples and measuring batter volume. I plated the samples, determined the identity of the involved species by performing several tests and obtained their count. At the end of the fermentation, I evaluated the quality of the batter and idli. I made every type of batter in duplicate and repeated the experiments to improve data reliability.</p> <p>Results I found that the fermentation is carried out by lactic acid bacteria from the <i>Leuconostoc</i> and <i>Lactococcus</i> species. Idlis made using 3:1 ratio were superior due to their sponginess resulting from a well fermented batter. Fenugreek improved not only the flavor but also the texture. Most importantly, it changed the microbial population distribution by favoring growth of <i>L. mesenteroides</i> and <i>Lactococcus lactis</i>.</p> <p>Conclusions/Discussion An analysis of the biochemical pathways led to neat insights into the role played by each species. The heterofermentative <i>Leuconostoc</i> are likely responsible for the rise of the batter and its aroma, while the homofermentative <i>Lactococcus</i> provide flavor. Fenugreek was able to alter flavor by stimulating the growth of <i>Lactococcus</i> while its ability to promote smoother texture arose from its stimulation of <i>L. mesenteroides</i>, a producer of dextran. In future, these effects of fenugreek could be verified through a dose response study as the results could have a far reaching impact on commercial food fermentations.</p>	
Summary Statement This project is an in depth study of the wild fermentation that occurs in the process of making the popular Indian snack idli, which is a steamed rice cake made from a fermented batter of ground parboiled rice and lentil.	
Help Received Mother provided guidance; Obtained a few items such as LB broth from Amgen Inc.	