



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY**

Name(s) Samagra Pandey	Project Number J0514
Project Title Effect of a Yeast Suspension's Aeration Length on its Metabolic Rate	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective of this study is to record and analyze differences in the metabolic rate of yeast with varying levels of dissolved oxygen in the yeast suspension.</p> <p>Methods A gas collection apparatus was used, which included a 3 liter tub, an inverted graduated cylinder, a squirt bottle, and clear plastic tubing. The carbon dioxide output of the yeast was the amount of displaced water in the inverted graduated cylinder. An aerator pump and airstone facilitated aeration of the yeast suspension. Stoichiometric ratios between carbon dioxide and ATP in the balanced cellular respiration and fermentation equations allowed for the conversion of the carbon dioxide output to the ATP production rate, which is an estimate of the metabolic rate</p> <p>Results Aeration lengths of 0 minutes, 5 minutes, 8 minutes, 10 minutes, and 12 minutes were used. The first condition was anaerobic, or lacking oxygen in the microenvironment, while the others were aerobic. The 0 minute samples had the highest carbon dioxide output, whereas all conditions had similar metabolic rates.</p> <p>Conclusions Repeated trials with all five conditions revealed that the aeration length of a yeast suspension did not have a significant impact on the metabolic rate of the yeast. Thus, the aerobic and anaerobic pathways have the same rate of energy output in yeast. By extension, us performing cellular respiration does not impede our metabolic rate, and therefore our health.</p>	
Summary Statement I showed that the amount of dissolved oxygen in the microenvironment of yeast does not affect its metabolic rate.	
Help Received I designed and set up the experiment by myself, but my father held the inverted graduated cylinder during testing.	