



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Hannah L. Ward	Project Number S0537
Project Title Ultraviolet Fermentation: The Effects of PUVA and PUVB Exposure on Saccharomyces cerevisiae Metabolism	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study examined how ultraviolets (PUVA/PUVB) effect the protein structure of Saccharomyces cerevisiae, yeast cell metabolism compared to other carboxyl- amino acids after using Thin-Layer Chromatography, TLC, to measure the rates on solute retention (Rf values) of polarity to measure the structural damage.</p> <p>Methods/Materials Metabolic process began with the yeast mixture, conducted with 11g of dry active yeast, 235mL warmed water, and 5g of sucrose. Using fermentation tubes and a containment submersion chamber, PUVA and PUVB 18' 10W bulbs, silica sheets, isopropyl alcohol solvents and the amino solutes glycine and phenolphthalien- will measure the retention values rf values in cm for each light and control tested with a metric ruler.</p> <p>Results After accessing TLC values and levels of significance for the yeast cultures and their rf values to glycine and phenolphthalein, the results show that the PUVB microrays had a greater significance in protein structure damage after metabolizing in the toxic lighting compared to the other yeast cultures. From 30sec-10min interval trials tested, the PUVB wavelenths emitted an average higher retention from 0.20-0.95 cm range.</p> <p>Conclusions/Discussion The PUVB microrays had a larger metabolic and steady increase in polarization over time, thus sign of cell damage. Ultraviolet-B range of shorter wavelength, which thought to intially cause less damage to the cell membrane and function; caused greater retention due to higher photon energy. Perhaps over a longer period of time, more damage would be seen from the PUVA emissions, in relation to longer wavelength over periodic events.</p>	
Summary Statement I conducted research on the different toxic wavelengths and their effects on yeast cells' metabolic structure and amino damage by examining their polarization in TLC.	
Help Received My AP Biology and Physics teacher helped me obtain the solute chemicals for the Thin-Layer Chromatography testing, as well as help me construct my hypothesis.	