# A Test to Determine the Effect of Ethyl Alcohol on the Degradation of Cellular Hydrogen Peroxide by Enzyme Catalase

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The original purpose to this experiment was to determine the effects of ethanol concentration on the degradation of hydrogen peroxide by catalase, which forms oxygen and water. We had thought that the ethyl alcohol (wine, beer, etc.) would denature the catalase, thereby inhibiting the reaction between catalase and hydrogen peroxide. However, this was not the case. After researching the reaction, we found that catalase was in fact catalyzing the ethyl alcohol into acetaldehyde and releasing hydrogen. These hydrogen atoms reacted with hydrogen peroxide to form water, thereby decreasing the oxygen output. This experiment contained several constants: 1mL of catalase, 22mL of hydrogen peroxide, and a time limit of 120 seconds. The independent variables were the varying volumes of ethanol. Each reaction of ethanol, catalase, and hydrogen peroxide was tested on a magnetic stirrer which stirred the reaction at a constant rate. The volume of oxygen given off by the reaction was collected using a gas collection apparatus. Success with this investigation led to further research on the application of such a reaction in the human body. It was discovered that catalase in the brain breaks down ethanol into a toxin called acetaldehyde. This carcinogenic poison has harmful effects on human tissues including DNA damage, addiction, and chromosomal abnormalities in cell culture studies.

**Awards Won:**