CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
J0426

Project Title
Fermentation

Abstract

Objectives/Goals
The objective is to ferment a variety of fruit juices and determine their ability to produce potential alcohol. The hypothesis states: fruit juices with greater sugar content when fermented with yeast will yield greater potential alcohol than fruit juices with lower sugar content.

Methods/Materials
Eight types of fruit juices were put into 40 plastic containers (each juice had 5 containers). The eight fruit juices started with different sugar contents: purple grape juice (15%), white grape juice (15%), cherry juice (13%), pear juice (13%), peach juice (12%), apple juice (11.5 %), pomegranate juice (11.5%), and cranberry juice (7%). Yeast, Saccharomyces bayanus, was added to all the containers and each was sealed with a lid, and stored at room temperature. Using a triple-scale hydrometer, percent of sugar, specific gravity (control of water), and percent of potential alcohol was measured every three days for 30 days.

Results
Purple grape, white grape, and peach juice fermented to potential alcohol the fastest. Fermentation was complete in 6 days. Apple, pear and pomegranate juices also had high sugar content and fermented to potential alcohol in 9 days. However, cherry juice which had a beginning sugar content of 13% did not ferment completely even after 30 days. Cranberry juice had the lowest amount of sugar (7%) at the beginning of the trial period and fermented to the least amount of potential alcohol. It also fermented at the slowest rate. The juices with the most sugar, purple grape juice and white grape juice (15% sugar) each produced the greatest yield of potential alcohol (8%). Cranberry juice had the lowest sugar content (7%) and produced the least amount of potential alcohol (0.25%).

Conclusions/Discussion
The hypothesis is accepted as demonstrated by those fruit juices with the highest sugar content yielding the highest potential alcohol. These data suggest other juices can ferment to potential alcohol. This might benefit the agriculture industry economically by manufacturing additional products. Secondly, cherry and pomegranate juice have a red color similar to purple grape juice. Red wines made from purple grapes have some cardiovascular health benefits. Therefore, it may be possible that cherry and pomegranate juices fermented to wine would have the same health benefits as red wine.

Summary Statement
This project demonstrates the fermentation of a variety of fruit juices and their ability to convert to potential alcohol.

Help Received
My parents helped me obtain the supplies and monitored the experiment. The Enology Department at CSU Fresno allowed me to tour their facility.