The Biosynthesis of Ethanol

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Abstract

Ethanol is renewable source in ferment and distilled liquids. Ethanol can be found in cleaning solvents, medicines, colognes, and aftershave. Ethanol is a benefit in gasoline; it helps lower carbon dioxide, hydrocarbon, and nitrogen emissions. Ethanol is a clean-burning alternative to gasoline. It can be beneficial to the skin because it acts as a cooling agent on the skin. The purpose of this project was to test and see which mixture would make the most ethanol and which solution would be the purest to actual ethanol. The mixture of fructose, yeast water and disodium phosphate produced the most ethanol with 38 milliliters. The mixture of yeast, sucrose, water and disodium phosphate was the purest in form to ethanol. In the future, a common interest will be to find ways to produce ethanol at a faster pace and at a more abundant amount.

Purpose of Study

Synthesize ethanol from various sources and determine which source produces the most ethanol and the purest ethanol in comparison to absolute ethanol

Hypothesis

The bread, sucrose, water, and disodium phosphate mixture would produce the most distilled pure ethanol in comparison to pure ethanol itself.

Introduction

Fermentation

- Fermentation is a chemical breakdown of a substance by yeast or other microorganisms
- Used for thousands of years for baking and brewing

What is ethanol used for?

- Solvent used in medicines, cleaning solutions, colognes, and after shave
- Clean burning alternative to gasoline
- Most gas in the United States is blended with Ethanol
- The most ethanol currently in gasoline is 15%

What is Ethanol?

- An intoxicating agent used in fermentation and distilled liquids
- Used in beer and wines
- Most widely used in biofuels
- Comes from two main sources: Sugarcane and corn

Renewable/non-renewable sources

Non-Renewable:

- Resources that cannot be replaced once supply is used up
- Examples: Oil, Uranium, and Coal

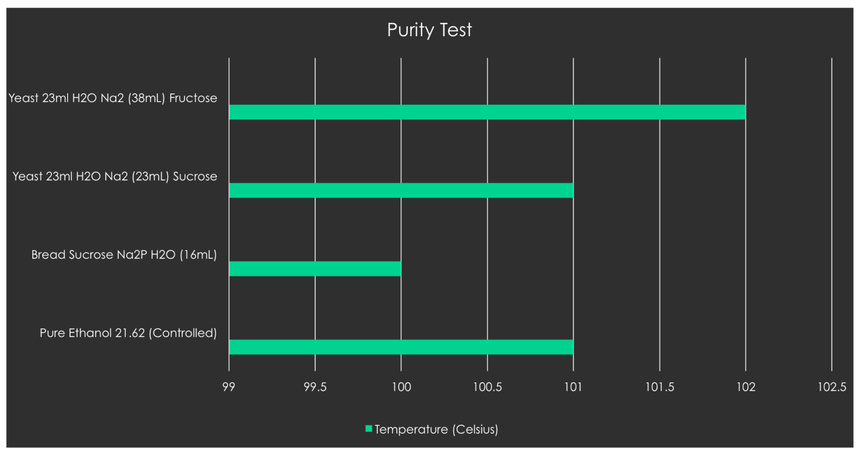
Renewable:

- Sources that can be replaced once they are used up
- Examples: Soil, Water, and Sunlight

Results

Amount of Distilled Ethanol

Bread, Sucrose, Water, Disodium Phosphate	16 Milliliters
Yeast, Sucrose, Water, Disodium Phosphate	23 Milliliters
Fructose, Yeast, Water, Disodium Phosphate	38 Milliliters



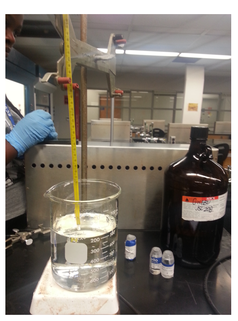
Methodology

- Make 500 milliliter flasks of sucrose, yeast, disodium phosphate, and water ; bread, sucrose, disodium phosphate, and water; and fructose, disodium phosphate, water, and yeast (Following packet)
- Connect flask with glass rod to test tube of calcium carbonate
- Let it ferment overnight

- SET UP DISTILLATION APPARATUS (MAKE SURE ALL PARTS MATCH)
- Pour each solution 19/22 or 22/40 500 milliliter flasks
- Sit flasks in heating mantle (set on ringstands)
- Collect each ethanol sample from each solution

- Prepare filter paper in Buchner funnel for filtering
- Pour fermented solution through Buchner funnel while running vacuum to remove solids

- Dip a capillary tube into each ethanol solution
- Boil 500 milliliters of water while inserting capillary tubes beside thermometer into the water
- Check tubes to see at what temperature the ethanol boils



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