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EFFECT OF CRANBERRIES ON YEAST FERMENTATION



Yeast Background

- Yeast occurs naturally in the human body.
- Yeast can be found in the vagina, rectum, digestive system and mouth.
- Excessive amounts of yeast causes itching and a burning sensation.
→ Yeast infection.



WHAT IS YEAST INFECTION?

• Yeast infection is a fungal infection of any of the Candida species (all yeasts).



• Includes infections that range from oral thrush and vaginitis, to life-threatening diseases.

• E.g. vaginal yeast infection when the pH of vagina goes from acidic to basic.



Cranberries



- Grown as shrubs in the wild, or on vines when cultivate.
- Bright red in color and have a slightly bitter taste.
- Excellent source of vitamins
- Contains Resveratrol.



Resveratrol and Yeast infection

- A powerful antioxidant
- Builds up the immune systems.
- Mostly found in fruits with red skins and blueberries



Question At Hand



Does Cranberry juice affect the rate of fermentation, and if so what is the maximum concentration tolerated by the yeast?

Hypothesis and Variables



- If cranberry juice is an effective home remedy for yeast infection, then increasing the concentration of cranberry juice will decrease the rate of fermentation.
- Manipulated Variable: Concentration of Cranberry Juice
- Dependent Variable: Rate of Fermentation (kpa/minutes)



Controlled Variables

- Temperature 37 degrees Celsius
- 5 mL of Yeast Suspension
- 5 mL of Sucrose
- 20 mL was the total volume



Materials



- Ocean Spray Cranberry Juice
- Fresh cranberries
- Blender
- Cheesecloth
- Centrifuge



Procedure 1



- The yeast mixture sat in the hot bath 40 min prior to experiment
- Added various [Cranberry Juice]
- Add the yeast last to all of the test tubes before running the trials
- After capping the test tube, the experiment ran for approximately 2 to 2.5 minutes



Data and Conclusion



Trial	Yeast Suspension (mL)	Sucrose (mL)	Cranberry Juice (mL)	DI Water (mL)	M.C.J. (v/v%)	Rate of Fermentation	pH
1	5	5	0	10	0	1.767	5
2	5	5	10	0	0.5	2.314	3

Difficulties

- The Cranberry juice from Ocean Spray contained apple juice, grape juice and cranberry juice
- Getting the proper concentration of juice from the cranberries
- Called Ocean Spray



Modifications to the Experiment



- Needed a Pure Cranberry Extract
- Took out any rotten berries and blended them
- Strained the mixture through a cheese cloth
- Centrifuged the juice from straining it
- Pipette the top portion of juice for new extract



Procedure 2

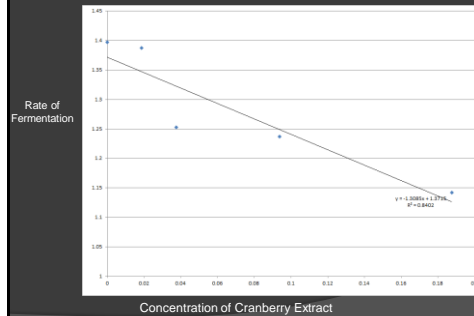
- The yeast mixture sat in the hot bath 40 min prior to experiment
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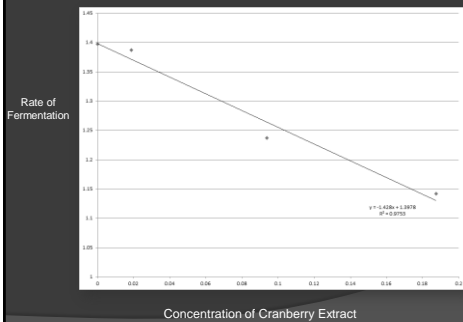
Data and Conclusions

Trial	Yeast Suspension (mL)	Sucrose (mL)	Cranberry Extract (mL)	DI Water (mL)	M.C.I. (v/v%)	Rate of Fermentation	pH
1	5	5	0	10	0	1.397	5
2	5	5	10	0	0.375	X	2
3	5	5	5	5	0.1875	1.142	3
4	5	5	2.5	7.5	0.09375	1.253	4
5	5	5	1	9	0.0375	1.237	5
6	5	5	0.5	9.5	0.01875	1.387	5

Rate of Fermentation vs. Concentration (with the outlier)



Rate of Fermentation vs. Concentration (without the outlier)



Discussion

- Our initial experiment did not support the hypothesis, but our revised experiment did
- Apple + Grape Juice = too much sugar
- Could have monitored the temperature better



Discussion

- ◉ Measure levels of pH
- ◉ The experiment was reproducible
- ◉ Cranberry extract applied to a yeast infection could help reduce a yeast fermentation

Further Experiments

- ◉ Try Cranberry Tablets instead of extract



- ◉ Does Cranberry extract work with just Baker's yeast or all species of yeast?



Works Cited

- ◉ Resveratrol:
<http://pi.oregonstate.edu/infocenter/phytochemicals/resveratrol/#sources>
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