

AICE Biology Practical 4

Carbohydrates metabolized by yeast

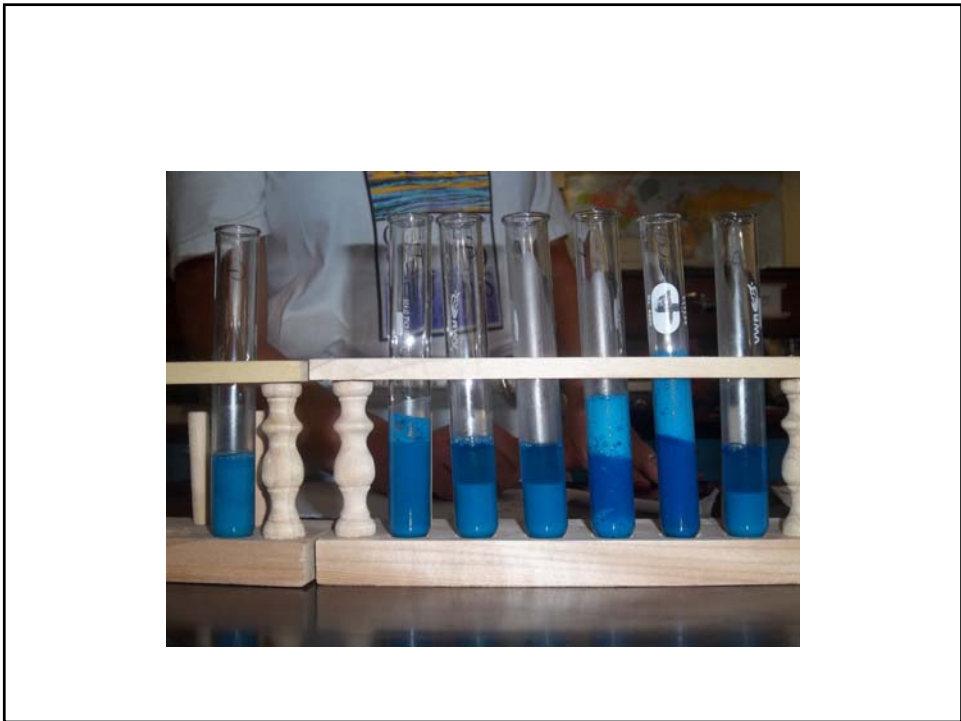
- The first 6 slides are photos of the lab done by Mrs. King as a test over the summer
- The remainder of the photos are of labs done by AICE Biology students



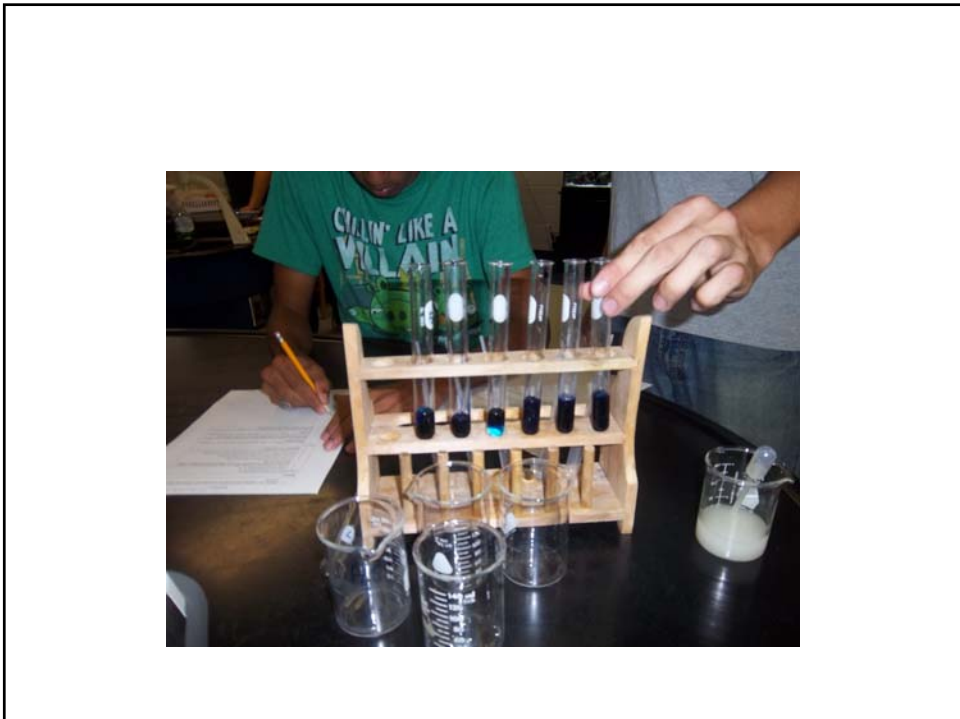
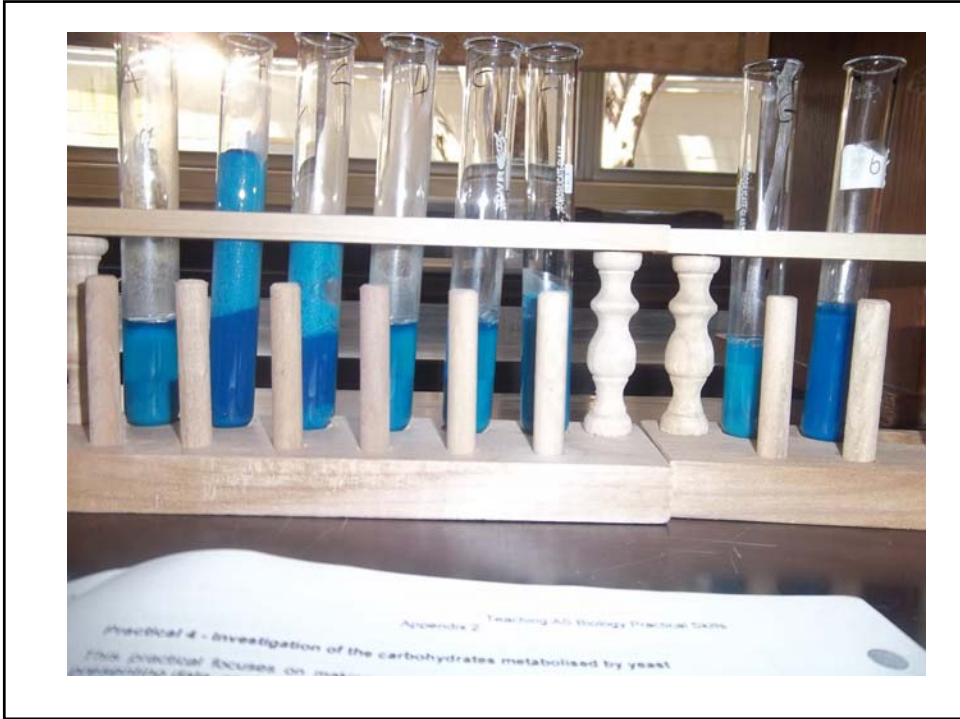
- Metabolism of various sugars by yeast to form CO₂ and H₂O indicated by reduction of methylene blue to clear liquid
- Yeast solution= 3-4g dry yeast in 50 ml H₂O
- Requires 24 hours to complete reaction

Background information

- Yeast can metabolise carbohydrates under two different conditions. When oxygen is present aerobic respiration occurs yielding a large amount of energy for the organism and producing carbon dioxide & water as waste products.
- However when oxygen is in short supply (anaerobic conditions) the yeast will break down the carbohydrate into ethanol & carbon dioxide with a much reduced energy output (alcoholic fermentation).
- Both of these forms of respiration in addition to most metabolic processes are catalysed by specific enzymes.
- The process of how efficient the yeast is in metabolising different carbohydrates can be monitored by observing the time taken for Methylene Blue to be discoloured.





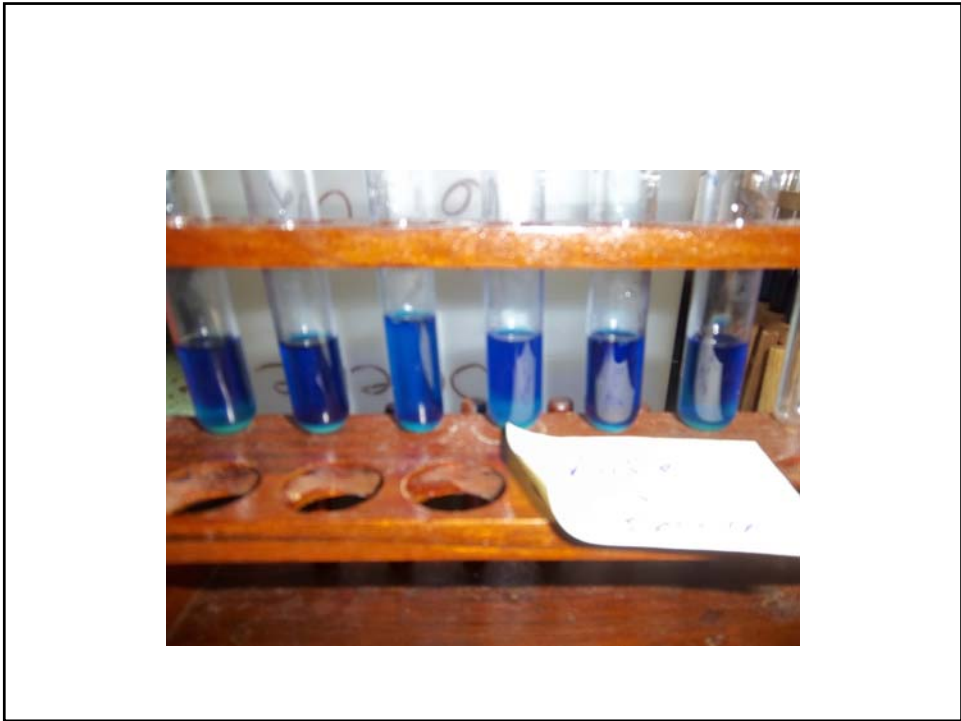












Write-up

- Record your results in a clear table ensuring units are put in headers where possible.
- Represent the results of the experiment in a suitable chart to show type of carbohydrate against the time taken for the blue colour to disappear.
- Explain your findings in terms of enzymes activity and carbohydrate structure.
- Assess the reliability of the results obtained and suggest any modifications you could make to improve the experiment

Discussion / evaluation points should include:

- Why should the tubes remain still after the initial mixing?
- What is being measured by the methylene blue discolouration (i.e. removal of oxygen from the system by the aerobically respiring yeast) ?
- Suggest why some sugars are metabolised and others are not.
- Why was the yeast incubated for about 30 minutes before the experiment started?
- What was the purpose of the tube with distilled water and yeast solution?
- Ensure that the students are aware of what type of organism that yeast belongs to.
- Yeasts live in many different environments. Suggest why the following are suitable places for yeast growth
 - a) fruit skin
 - b) Human body
- What precautions could be undertaken to ensure that all the tubes remained at a constant temperature?

Type of carbohydrate	Time taken for blue colour to disappear (minute:secs)
Glucose	6:15
Fructose	24:45
Galactose	No change
Lactose	No change
Maltose	25:30
Sucrose	8:40
Starch	42:00