

Invertase

Introduction

Invertase is easy to obtain as a commercial preparation or from a culture of yeast and can be used for a variety of safe and simple yet interesting and rewarding investigations

Background

Invertase converts the disaccharide sucrose into the monosaccharides glucose and fructose by hydrolysing the bond between them.

Sucrose is a non-reducing sugar and gives negative results with Benedict's and DNSA reagents. These can therefore be used to monitor the enzyme by measuring the appearance of the reducing sugars glucose and fructose.

Invertase is found in the lining of the small intestine but the usual commercial source is yeast. Commercial preparations are available but the enzyme activity can easily be shown by culturing yeast.

Suggestions for investigations

- Effect of temperature on rate of reaction.
- Effect of pH on rate of reaction.
- Isolation and partial purification of enzyme.
- Experiments with immobilised enzymes

Preparation of invertase

Invertase can be obtained from dried yeast sold for home baking. We have obtained the best yield using the following recipe and growing for six hours at 35°C.

- Dried yeast 10g
- Sucrose 5g
- Yeast extract* 1g
- Peptone* 1g
- Water to 50cm³.

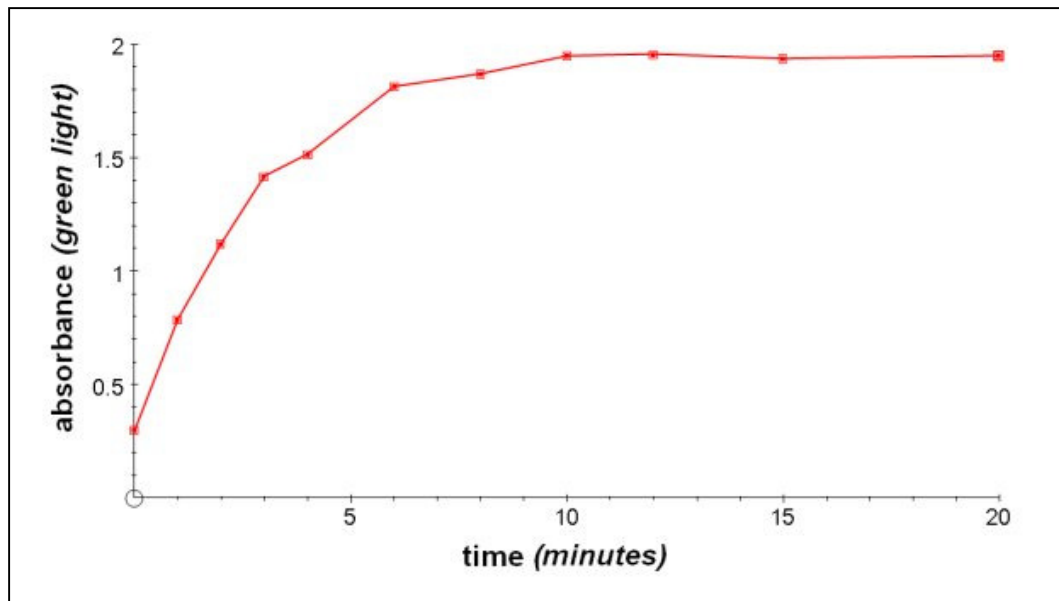
*Yeast extract and peptone can be replaced with 2g Marmite or Vegemite

Once growth has finished and the culture has separated out the clear liquid on top should contain a high concentration of invertase.

If a centrifuge is available a short spin will remove any remaining yeast cells.

Reaction mixture

Incubate 1cm^3 of invertase solution prepared from yeast with 9cm^3 of 0.4M sucrose solution in citrate buffer pH6 at 35°C . After about 10 minutes the sucrose has all been converted to the reducing sugars glucose and fructose. This method gave the results shown in the graph below using DNSA to detect reducing sugar.



More details, suggestions for investigations and sample results can be viewed on the *Mystrica* website, www.mystrica.com