

# WJEC England Biology A Level

SP C1 01: Investigation of  
dehydrogenase activity in yeast using  
artificial hydrogen acceptors

Practical notes



## Introduction

In the presence of oxygen, yeast respire **aerobically**. **Dehydrogenase** enzymes remove **hydrogen atoms** from certain molecules and transfer them to **hydrogen acceptors** such as NAD.

**Artificial hydrogen acceptors** such as **methylene blue** accept hydrogen atoms. They become reduced and undergo a visible colour change (e.g. methylene changes from **blue** to **colourless**). This allows the rate of dehydrogenase activity in organisms such as yeast to be investigated.

## Equipment

- Methylene blue
- Yeast suspension
- 10 cm<sup>3</sup> syringe
- 1 cm<sup>3</sup> syringe
- 35°C Water bath
- Boiling tube
- Bung
- Stopwatch

## Risk assessment

Hazard	Risk	Precaution	Emergency
Broken glass	Cuts	Keep glassware away from the edge of the desk	Dispose of broken glassware carefully; elevate cuts and apply pressure; do not remove glass from cuts; seek medical assistance
Methylene blue	Irritation to eyes	Wear safety goggles	Flood eye(s) with tap water; seek medical assistance
Yeast suspension	Irritation to eyes	Wear safety goggles	Flood eye(s) with tap water; seek medical assistance



## Method

1. Using the **10 cm<sup>3</sup> syringe**, add **10 cm<sup>3</sup>** yeast suspension to the boiling tube.
2. Place the boiling tube in the **35°C** water bath for 10 minutes to allow it to **equilibrate**.  
*35°C is the optimum temperature for respiratory enzymes in yeast cells.*
3. Using the **1 cm<sup>3</sup> syringe**, add **1 cm<sup>3</sup>** methylene blue indicator to the boiling tube. Insert a bung and invert to mix.
4. Place the boiling tube in the 35°C water bath and start the stopwatch. Time how long it takes for the solution to turn from **blue** to **colourless**.

## Results

The rate of dehydrogenase activity can be **estimated** using **rate = 1/t**.

The effect of different factors (e.g. temperature) on the rate of dehydrogenase activity can be determined by changing **one variable only**, and observing its effect on the rate.

