

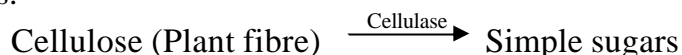
## ENZYME ACTION

---

**NAME:** Cellulase

**DESCRIPTION:** Amber liquid, MC23.65.

**ACTION:** The enzyme cellulase acts upon cellulose fibres to break them down into simple sugars.



**STORAGE:** Store in the refrigerator at 4°C.

**SAFETY:** Enzymes are biologically active proteins and should be handled with care. Avoid direct contact or inhalation.

### TIPS FOR TEACHERS:

---

#### Suggested pracs:

Take a piece of filter paper 2cm<sup>2</sup> and shred it into a test tube. Add 5mL of a 50% cellulase solution and place in a water bath held at 50°C. For the control, add 5mL of water to an equal quantity of filter paper and place in the water bath. The filter paper should show disintegration and a change in appearance within 1 hr.

#### To confirm the formation of simple (reducing) sugars:

When the reaction is complete, transfer 3mL of the filter paper mixture to a clean test tube. Add an equal volume of Benedict's Solution and shake to mix. Heat in a boiling water bath for 1 – 3 minutes. A colour change from blue to orange is a positive indication for the presence of reducing sugars.

To eliminate the possibility of reducing sugars being present in the starting reagents as contaminants, test both the cellulase and the Control with Benedict's solution. Clinistix diagnostic strips can be used as an alternative to Benedict's solution.

#### Comments and further Ideas:

Cellulose is the most abundant organic chemical on earth. It is the principle constituent of the cell wall of plants and thus is found in materials such as timber, cotton, paper and other plant fibres. Alternative sources of cellulose for investigation are: wood, newspaper, grass, straw or corn stalk.

Bacteria living in the digestive tract of invertebrates such as termites and silverfish, and ruminants such as cattle are responsible for producing cellulase that allows them to digest their food more efficiently.

Please note: Variations in substrate composition and enzyme activity can mean that the suggested experiment might not work exactly as described in every situation.