C1.1 Enzymes and metabolism: data-based questions

What the Cell · DP Biology · data-based questions

Name _____ **Date** _____ **Total** _____ / 8

Read the data carefully before you answer. The number of marks shows how many separate points to make. Show your working in calculations.

1 A cofactor and an immobilised enzyme

8 marks

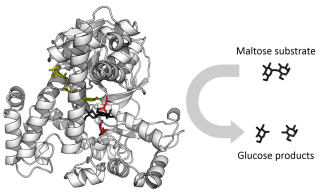
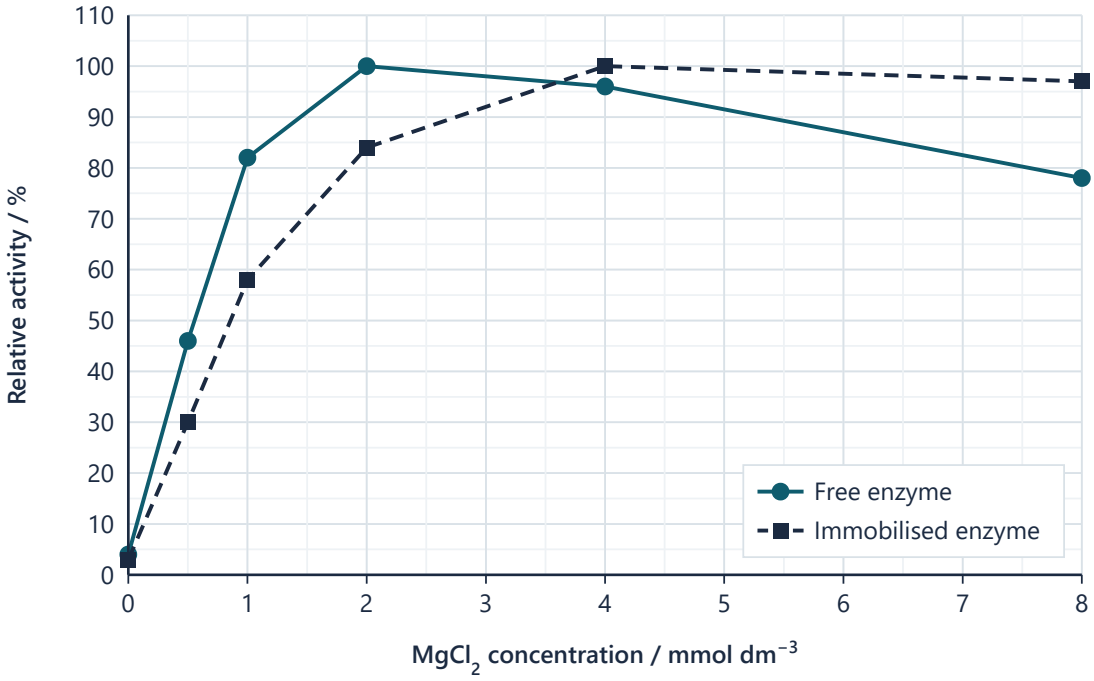


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Hexokinase from yeast was tested free in solution and immobilised in alginate beads. ATP was kept at 1.0 mmol dm^{-3}, and the concentration of magnesium chloride ($MgCl_2$) was varied. Activity is given as a percentage of the highest activity measured for that form of the enzyme.



a **State** the relative activity of the free enzyme at 1.0 mmol dm^{-3} $MgCl_2$. [1]

b **Identify** the $MgCl_2$ concentration that gives the highest activity for each form of the enzyme. [2]

c **Calculate** the ratio of ATP to $MgCl_2$ concentration at which the free enzyme is most active. [1]

d **Explain** why there is almost no activity without magnesium ions. **[2]**

e **Suggest** why the immobilised enzyme needs a higher $MgCl_2$ concentration to reach its highest activity. **[1]**

f **State** one advantage of immobilising enzymes for use in industry. **[1]**