

8 Plants usually take up nitrogen as nitrate ions for use in growth.

- (a) An investigation was undertaken to study the effect of nitrate ion concentration on mitosis in the root tip of wheat seedlings.

Wheat seedlings were grown in a mineral solution containing a nitrate ion concentration of 3.3 mmol dm^{-3} . Root tip samples were taken and the number of cells undergoing mitosis per 500 cells was counted.

This was repeated using a nitrate ion concentration of 6.6 mmol dm^{-3} . The results are shown in the table below.

Nitrate ion concentration / mmol dm^{-3}	Number of cells undergoing mitosis per 500 cells
3.3	25
6.6	19

- (i) Using the information in the table, describe the effect of nitrate ion concentration on mitosis in root tips.

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- (ii) Suggest why a prediction of the number of cells undergoing mitosis, if the nitrate ion concentration used were 9.9 mmol dm^{-3} , would be unreliable.

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(iii) To count the number of cells undergoing mitosis, a root tip squash was carried out.

Give **two** potential safety risks associated with the root tip squash technique. For one of the risks you have given, suggest a precaution to reduce the risk.

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QUESTION 8 CONTINUES ON THE NEXT PAGE



(b) Describe an experiment to find the optimum nitrate ion concentration for the growth of wheat seedling roots.

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(Total for Question 8 = 10 marks)

TOTAL FOR PAPER = 80 MARKS

