

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

