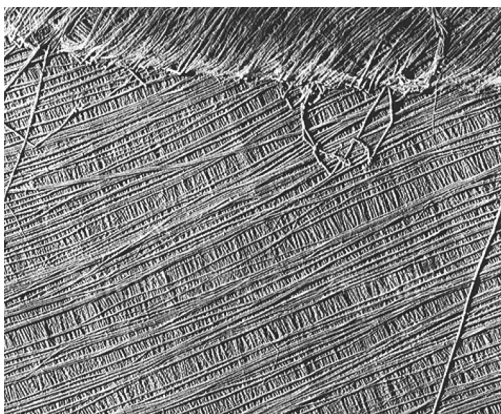


- 6 The photograph below shows part of a cellulose cell wall, as seen using an electron microscope.



© Biophoto Associates/Science Photo Library

Magnification  $\times 70\,000$

- (a) Using the information in the photograph and your own knowledge, describe the structure of a cellulose cell wall.

(3)

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(b) Cellulose can be used to produce biofuel. The xylem tissue in wood is a good source of cellulose. The cell walls of this tissue are heavily lignified.

(i) Explain what is meant by the term **tissue**.

(2)

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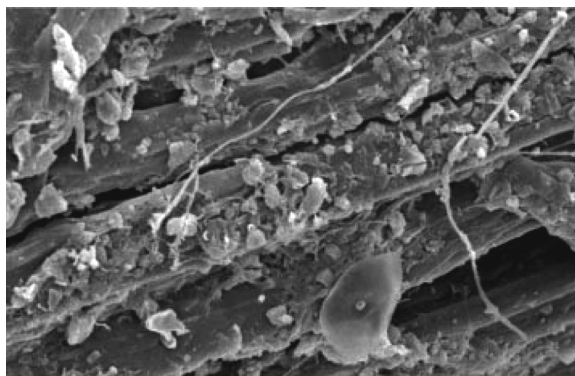
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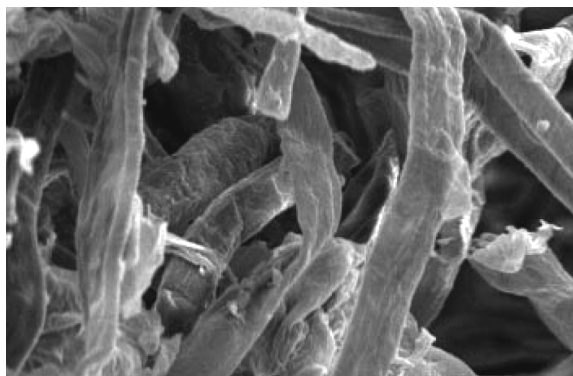
(ii) The cellulose in the xylem tissue of wood has to be broken down by enzymes before it can be used to produce biofuels.

The lignin has to be removed before the enzymes can be used to break down the cellulose.

The photographs below show fibres containing cellulose before and after the removal of lignin.



Before removal of lignin



After removal of lignin

Source: SciELO

Magnification  $\times 500$

Using the information from the photographs, suggest how lignin adds strength to xylem tissue.

(2)

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(c) Mineral ions such as calcium, nitrate and magnesium are transported in the xylem vessels. These mineral ions are dissolved in water.

(i) Describe how the structure of xylem vessels allows them to transport water.

(2)

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(ii) Explain how calcium, nitrate and magnesium ions are used by plants.

(3)

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**(Total for Question 6 = 12 marks)**

