

Cows, but not people, can use grass as a source of nutrition. Their four-chambered stomach houses large populations of certain microbes that are not normal inhabitants of our stomach.

- a) Describe the kind of metabolic reactions you think these microorganisms carry out. (2)
- b) Why are people unable to digest grasses? (1)
- c) What do you think would happen to a cow undergoing treatment with an antibiotic that killed all of these microorganisms? (2)

Response

- a) - Cellulose is a polysaccharide of β glucose
 - The microbes are digesting cellulose by hydrolyzing the β 1 \rightarrow 4 links
 - This releases glucose which can be used as a source of energy for the cow
 - They could also be hydrolyzing the bonds in starch in the grass
- b) - Humans lack an enzyme able to recognize the β 1 \rightarrow 4 links
- c) - If the microbes were killed, the cow would be unable to digest cellulose
 - A major energy source would be lost
 - Without sufficient energy the cow would die