

Past-paper walk-through

Genetically modified organisms in agriculture ■ 19.3

eXercise

Questions in this set

- 9700/41 N25 Q8 ■ 9 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 8

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- 8 LibertyLink® soybean is a genetically modified crop. It was first grown in 1996 and used in food products from 1998. It has been grown in 6 countries and used in food products in 21 countries.

Table 8.1 summarises the modifications made to the soybean plant to produce LibertyLink® soybean.

Table 8.1

name of introduced gene	gene donor organism	gene product	function of gene product
<i>pat</i>	<i>Streptomyces viridochromogenes</i>	phosphinothricin <i>N</i> -acetyltransferase	stops action of glufosinate, a herbicide

- (a) Explain how the modification made to produce LibertyLink® soybean may help to solve the global demand for food.

Question 8

- (b) (i) Name the type of enzyme that could be used to cut out the *pat* gene from *S. viridochromogenes*.

Question 8

- (ii) Name the enzyme that could be used to join the *pat* gene to a plasmid by forming phosphodiester bonds.

Question 8

- (c) Suggest reasons why LibertyLink® soybean is used in food products in 21 countries but only grown in 6 countries.

Question 8

[Total: 9]

Solution 8

(a) Mark scheme

- any four from:
- 1
- (Liberty Link soybean / it, is) not harmed by / not killed by / resistant to, herbicide / glufosinate ;
- 2
- herbicide / glufosinate, kills, weeds / unwanted plants ;
- 3
- reduces / removes / less / no, competition (with, weeds / unwanted plants) ;

Solution 8

- 4
- ref. to (sun)light / water / (named) soil minerals ;
- 5
- higher yield or more crop, harvested / produced ;
- 6
- AVP ;
- 4

Solution 8

(b)(i)

Mark scheme

- restriction, enzyme / endonuclease ;
- 1

(b)(ii)

Mark scheme

- (DNA) ligase ;
- 1

Solution 8

(c) Mark scheme

- any three from:
- some / other / 21, countries:
- 1
- may, have, unsuitable / described problem in, climate / weather / soil ;
- 2
- no regulatory approval / may have banned (GM / Liberty Link) ;
- 3
- may have, (activist) groups / people, opposed to GM crops ;

Solution 8

- 4
- may not have land space available ;
- 5
- may have banned, herbicide / glufosinate ;
- 6
- AVP ;
- 3
- 9700/41
- October/November 2025