



The Society of  
Food Hygiene  
and Technology



## Genetic Modification of Foods

### INTRODUCTION

Genetically modified (GM) foods are derived from organisms whose DNA has been modified through genetic engineering, unlike similar food organisms developed through the conventional genetic modification of selective breeding (plant breeding and animal breeding) or mutation breeding. GM foods were first put on the market in the early 1990s. Typically, genetically modified foods are plant products: soybean, corn, canola, and cotton seed oil, but animal products have been developed.

Genetic modification can offer potential to improve the quality and quantity of the food supply but the impact of this technology must be objectively assessed through scientific investigation. Stringent controls are necessary to protect the consumer and the environment; and consumer education and information are fundamental to public acceptance.

Some consumers may wish to choose products which do not contain GM-derived ingredients, and UK food and drink manufacturers should therefore continue to provide choice.



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### Background

Genetically modified (GM) foods and other types of novel foods can only be marketed in the European Union (EU) if they have passed a rigorous safety assessment. GM foods may only be authorised for sale if they are judged not to present a risk to health, not to mislead consumers and not to be of less nutritional value than the foods they are intended to replace.

This requirement applies to both living GMOs such as rapeseed and soya beans, and to feed and food ingredients derived from the processing of GM crops. The authorisation procedure includes a safety assessment by the European Food Safety Authority (EFSA). On the basis of these assessments, there is no reason to suppose that GM feed presents any more risk to farmed livestock than conventional feed. GM feed, which is very unlikely to contain viable GMOs, is digested by animals in the same way as conventional feed. Food from animals fed on authorised GM crops is considered to be as safe as food from animals fed on non-GM crops.

The spread of biotechnology through commodity exporting countries has meant that supplies of animal feed materials to the EU will contain a growing proportion of GM derived products. It is not possible to quantify this as there is no legal requirement to collect such data, but these imports are considered by the EU feed industry as unavoidable because the EU is not self-sufficient in protein rich feed. The European Feed Manufacturers' Association estimates that the EU livestock industry as a whole imports 77% of its protein requirements. In addition, 98% of the soya bean meal imported by the EU is sourced from Brazil and Argentina, which are major producers of GM soya. Brazil and Argentina also supply the EU with significant quantities of maize for starch manufacture, the by-products of which go for feed use; much of this will be GM. The UK imports cotton meal from Brazil, India and China, which are major producers of GM cotton.

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Identity preservation - i.e., the segregation of GM and non-GM crops after harvest and during transport, storage and subsequent use - is not routinely practiced by commodity exporting countries, but can be achieved at a premium. This additional price will vary according to the state of the commodity markets and the nature of demand for the end products (i.e., milk, meat and eggs for human consumption).

### **How is GM technology carried out?**

In simple terms, the gene technologist uses a "cutting-copying-pasting" approach to transfer genes from one organism to another. For this, bacterial enzymes are used that recognise, cut and join DNA at specific locations acting as molecular "scissors-and-tape". However, the selected gene is copied billions-fold, with the result that the amount of original genetic material in the modified organism is immeasurably small. Since DNA does not always readily move from one organism to another, "vehicles" such as plasmids (small rings of bacterial DNA) may be used; alternatively, some plant cells may be transformed by "shooting" small particles coated with the new DNA into the target cell using a special type of gun, the "Gene Gun". The modified cell can then be used to regenerate a new organism.

### **Legislation**

The current procedures for evaluation and authorisation of GM foods are laid down in Regulation (EC) 1829/2003 on GM food and feed.

This legislation came into force in April 2004. There are two separate regulations, Regulation 1829/2003 on genetically modified food and feed and the details affecting traceability and labelling of GMO's and traceability of foods and feeds produced from GMO's are contained in EC Regulation No 1830/2003.



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These provisions require that, from April 18th 2004, product labelling specifies those foods or ingredients:

- that contain GMO's
- that are produced from GMO's, even if no GMO material is present that are produced with the help of GMO's when the material in question is still present in the food (e.g. enzymes produced by genetically modified micro organism, used in food manufacture and still, present in the food.

Before a genetically modified organism (GMO) can be either grown or marketed in the European Union (EU), it must be granted a marketing consent (i.e. authorised) under European Community (EC) legislation - EC Regulation 1829/2003 laying down the authorisation procedures for GM food and feed (the 'GM Food and Feed Regulation').

### Labelling

Before 18 April 2004, GM material for feed use was not required to be labelled. Since then, labelling has been required for feed materials that contain GM or GM derived material. Labelling is not required for consignments containing adventitious or technically unavoidable traces of GM, up to a threshold of 0.9% for GM varieties approved in the EU. Until April 2007, there was a second threshold of 0.5% for varieties that had received a favourable scientific assessment but had yet to be authorised in the EU, but this was a temporary arrangement which has since expired. According to the European Feed Manufacturers' Association, 85% of the EU's compound feed production is now labelled to indicate that it contains GM or GM derived material.

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### SUMMARY

During the last decade, genetically modified (GM) crops grown by 12 million farmers have already provided significant improvements in the quantity and quality of the food supply as well as providing benefits to the environment by reducing pesticide usage, soil erosion and carbon emissions. There is currently no scientifically documented evidence of harm to human health.

Furthermore, the “second generation” of GM crops and those in the research pipeline have the potential to deliver crops to provide nutritional benefits; crops with more effective utilisation of fertiliser; crops that will grow under drought and other adverse climate conditions; and crops that will grow on previously inhospitable land.

The use of GM techniques can be continued safely providing that issues of product safety, environmental concerns, information and ethics are satisfactorily addressed.