



7 Facts about Genetically Engineered Food

Fact No. 1: **Genetic engineering (GE) is a laboratory technique.**

Genetic engineering is a laboratory created seed technology that was commercialised for farming in 1995. It is an artificial process that cannot occur naturally. To date, no crop plant has been engineered for higher yield.

Transgenics: where a cell has been altered by the random insertion of DNA from another species through laboratory engineering.

Gene Editing: (CRISPR, TALENS, ZFN)
an RNA enzyme cuts the chromosome and either deletes a gene/s or inserts an artificial gene.

Gene drives: force harmful genes through the whole population of a species posing major risks to ecosystems as they can't be recalled. These may easily spread to related native species and have potential to cause extinction of keystone species.

GE usually employs bacterial and viral vectors to transport the foreign DNA/RNA into cells. These altered genes end up in every cell of the plant.



Fact No. 2: **Genetic engineering is imprecise and uncontrollable**

Gene editing tools like CRISPR can create unintended alterations (off target effects). The random insertion of foreign gene or genes may cause unexpected changes in the function. Existing molecules may be manufactured in incorrect quantities, at the wrong times, or new molecules may be produced. GE foods and food products may therefore contain unexpected toxins or allergens that could harm our health.

Nature has developed processes that ensure genes in seeds are passed onto the next generation. Genes do not operate in isolation, but interact in complex ways that are not yet fully understood. Their expression can change in response to internal influences and to environmental triggers. eg day-length or temperature.

Although a gene can be cut out from the DNA of an organism, its insertion into the DNA of another organism is entirely random. This results in the disruption of the chromosome's DNA, which can lead to unexpected changes in the functioning of the cells, whole plants or animals.

Imported GE food that is processed or prepared on site (eg. supermarket bread, restaurant foods), containing less than 1% GE ingredients, is exempt from being labelled as GE.

Fact No.3: **GE food has not undergone trials for safety**

We rely on the assessments carried out by Food Standards Australia New Zealand (FSANZ), usually based only on data supplied by the biotechnology companies. These companies normally own the patents for the GE organisms, thereby standing to benefit financially from the use of GE food.

Gene editing can force genetic changes by overriding cellular repair systems that protect vital areas of DNA from random mutations. Food from gene-edited crops could not have occurred in nature, so these plants have no history of safe use as food. Independent long-term testing of each new gene-edited crop is required before we can be sure that GE food is safe to eat.

New Zealand currently requires this stringency and this regulating should continue.

Fact No.4: Produce grown in New Zealand and all certified organic food is currently non-GE

GE products may be found in foods containing the following **imported ingredients**:

- Soya flour (often in breads, sausages, etc.)
- Lecithin (in chocolate, ice cream etc.)
- Vegetable Oils (canola, soy, cotton seed, corn, rice oil)
- Corn (maize)
- Potato flour
- Wheat flour
- Yellow Rice



Fact No.5: GE crops have substantially increased herbicide and pesticide use

Crops engineered to be resistant to specific herbicides often have multiple genes (stacked genes), allowing the crop to be sprayed with up to 6 toxic herbicides, often several times per growing season. Since 1998, pesticide use in crops have increased by approximately 200 times. Weeds resistant to herbicides (“super weeds”) and insects resistant to pesticides are now plaguing farmers in the US & South America. This has led to the increased use of even more toxic herbicides and pesticides.

Cross-pollination occurs between GE crops and non-GE crops and their wild relatives. This can occur via insects, birds and the wind carrying GE pollen and seed into fields, often far away from the source. There is also evidence that GE crops, engineered to produce their own insecticide can kill beneficial insects (eg. bees) and soil organisms (eg earthworms and soil microbes). These insect-resistant GE plants exude toxins that poison the soil and have caused a devastating decline in pollinator species (bees and butterflies) and birds.

Fact No. 6: GE crops do not benefit farmers or the environment

Seeds of GE crops are patented and thus more expensive than those of conventional crops. Farmers have reported that yields on average are no higher and have not improved profitability. Insurance companies in the USA and UK do not insure farmers for losses from growing GE crops. Farmers growing GE crops have to sign binding contracts with the biotechnology companies. This means they can only use herbicides produced by the biotechnology companies. They must buy more expensive GE seeds each growing season.



Fact No. 7: Organics is climate action

A 30-year study carried out by the Rodale Institute, USA, found that GE crops have no overall improvement in yield compared to the same non-GE crops. The study showed that crops, performance, cost and yield from organic growing outperformed conventional growing methods, especially in climate-disturbed (eg floods, droughts) years.

The breeding of improved, often heritage, seed varieties is now faster than GE, because of non-GE lab techniques. Heritage varieties of crop plants are often well adapted to a range of climatic and soil conditions.

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