

Committee : Ecology & Environment

Topic: The Question of the use of GMOs as a means of combating poverty and hunger.

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INTRODUCTION

Most of the foods we eat today were created through traditional breeding methods. But changing plants and animals through traditional breeding can take a long time, and it is difficult to make very specific changes. After the development of genetic engineering in the 1970s, this process was shortened and simplified significantly.

How are GMOs made?

GMO has become the common term consumers and popular media use to describe foods that have been created through genetic engineering. This is a process that involves:

- Identifying the “gene” that gives an organism a desired trait.
- Copying that information from the organism that has the trait.
- Inserting that information into the DNA of another organism.
- Growing the new organism.

The process of bringing a GMO plant to the marketplace takes several years and steps of quality control and authentication.

There are several genome editing tools, such as CRISPR. Scientists can use these newer editing tools to make crops **more nutritious, drought tolerant and resistant to insect pests and diseases.**

Equally, bacteria have been genetically modified to produce medicines that can cure diseases or vaccines that prevent them. A commonly used medicine that comes from a genetically modified source is insulin, which is used to treat diabetes.

Why do we use GMOs?

The primary benefits of GMOs are experienced almost exclusively by farmers and agricultural companies. Genetically modified plants can repel only the very particular insect that feeds on it. With some crops, this has significantly lowered the need to apply pesticides. Other GM plants have been developed to be resistant to certain herbicides, thus making weed control more straightforward and less expensive.

This lowers costs for farmers, results in less soil erosion (because tillage isn't as necessary for weed control), and avoids the environmental damages caused by pesticide application.

As mentioned above, GMOs are also used to produce many medicines and vaccines that help treat or prevent diseases. Before GMOs, many common medicines had to be extracted from blood donors, animal parts, or even cadavers. GMO medicines minus the risk of contamination, unreliable supply and inconsistent quality.

What are the main issues of concern?

Gene transfer: gene transfer from GM foods to cells of the body or to bacteria in the gastrointestinal tract would cause concern if the transferred genetic material adversely affects human health.

Outcrossing: The migration of genes from GM plants into conventional crops or related species, as well as the mixing of crops derived from conventional seeds may have an indirect effect on food safety and security.

Allergenicity : protocols for the testing of GM foods have been evaluated by the FAO and the WHO. No allergic effects have been found relative to GM foods currently on the market(2014).

KEY DEFINITIONS OF TOPICS

GMO - (genetically modified organism) - foods that have been created through genetic engineering. Involved "copying and pasting" the desired gene (trait).

BACKGROUND INFORMATION

(insert geological maps/ graphs)

Major Countries and Organizations Involved

GMOs are currently being grown and produced in 29 countries around the world. (Spring 2020) However, at one point, 22 different crops were being grown in 41 countries globally.

The main **advocates** and experimenters of GMOs are **China, Canada, USA** and other American countries such as Brazil, Argentina, Paraguay, Uruguay, Mexico and Chile.

Several countries such as France, Germany, Austria, Greece, Hungary, Italy, Croatia, Luxembourg have chosen a **total ban** on GMOs.

As the development of GMOs are primarily being driven by the USA, a large proportion of the regulation and approval of relevant foods, crops etc. are being determined by American organisations such as the **FDA (Food and Drug Administration)**. However, each country has a regulation agency for local produce.

Whilst there is a relatively popular movement towards GMOs, there is also a fairly large opposition to the technique, especially with regards to mislabelling/ misleading labelling. These organisations include, but are not limited to :

- Organic Consumers Association - 850 million members and constituents; 'Millions Against Monsanto' campaign for GMOs to be correctly and clearly labelled.
- Non GMO Project - provides North America's only labels that products have not been genetically modified.
- Are We Eating Fishy Food - nationwide advertising campaign for labelling.
- GMO Inside - offering what the organic, non-GMO alternatives are.
- Just Label It! - coalition of 650+ organisations and 300,000 members fighting for mandatory labelling.

Relevant UN Treaties and Events

Cartagena Protocol - international agreement on biosafety; aims to ensure the safe handling, transport and use of living modified organisms (LMOs).

Aarhus Convention - empower people with the rights to access information, participate in decision-making in environmental matters and to seek justice.

Timeline of Events

1980- first GMO patent issued; allowing for the first patent on a living organism - a bacterium used to combat oil spills.

1982- FDA approves the first consumer GMO product developed through genetic engineering: human insulin to treat diabetes.

1986- Federal government established the Coordinated Framework for the Regulation of Biotechnology. This policy describes how FDA, USDA and EPA work together to regulate the safety of GMOs.

1992- FDA policy states that foods from GMO plants must meet the same requirements, including the same safety standards, as the food derived from traditionally bred plants.

1994- a GMO tomato (first GMO product created through genetic engineering) becomes available for sale.

1997- The EU rules in favour of mandatory labelling on all GMO food products, including animal feed.

1999- Over 100 million acres worldwide are planted with genetically engineered seeds. The marketplace begins embracing GMO technology at an 'alarming rate'.

2003 - The WHO and the FAO of the United Nations develop international guidelines and standards to determine the safety of GMO foods.

2004 - UN announces new measures to boost safety in trade of GMOs; adoption of labelling and documentation requirements.

2011- Research in Eastern Quebec finds Bt toxins in the blood of pregnant women and shows evidence that the toxin is passed to fetuses.

2015- FDA approves an application for the first genetic modification in an animal for use as food - a genetically engineered salmon.

Solution to Hunger?

GM crops will hopefully produce more yield on less land. This may increase the overall productivity and may offer developing countries a means to sustain themselves and reduce hunger worldwide. 90% of the world's 13.3 million "biotech crop farmers" are from developing countries.

The potential advantages that biotechnology can confer across a wide range of agricultural applications are in areas such as livestock management, storage of

agricultural products and sustaining current crop yields, while reducing the use of fertilisers, herbicides and pesticides.

“Golden Rice” - created by researchers in Germany and Switzerland; contains 3 new genes - one from the daffodil, one from a bacterium that helps it to produce provitamin A. This rice is available as a possible option for mass distribution. It has been suggested for use in countries in parts of South-East Asia and Africa, where approximately 375,000 vitamin A deficient children become blind every year, half of whom die within 12 months of losing their sight.