

The background of the image is a dark blue and purple night sky filled with numerous white stars of varying sizes. In the foreground, there is a dark silhouette of a forest of evergreen trees. The overall aesthetic is serene and celestial.

# TOPIC OF THE WEEK

MAR'19 (07 to 13 Mar)

## **GENETIC ENGINEERING – FRIEND OR FOE?**

A new paper published in the journal Trends in Plant Science proposes an alternative: engineering tomato plants to produce capsaicinoids. If all goes well, someday, you could enjoy a spicy tomato, or even be treated with capsaicinoids extracted from one. The researchers write that not only will this Endeavour help better understand the evolution of this unique botanical trait but perhaps allow for the development of some new varieties of produce in the grocery aisle. All these are possible just because Of Genetic Engineering; Genetic engineering refers to the direct manipulation of DNA to alter an organism's characteristics (phenotype) in a particular way. For example, genetic engineering can be used to produce plants that have a higher nutritional value or can tolerate exposure to herbicides.

The first genetically modified organism to be created was a bacterium, in 1973 and then it was applied to mice. Genetic engineering has a number of useful applications, including scientific research, agriculture and technology. While this technology is regarded as promising by many people, it does not come without

some criticisms, particularly on the issue of altering life. Talking about its advantages, Genetic Engineering aids in the creation of better pharmaceutical products, it presents a potential to increase human life span and also it has the capacity to make diseases a thing of the past.

It is being implemented in various areas such as agriculture even though there are many alternatives that can be found for genetic engineered crops, such as organic materials and reducing leeching of the soil. The controversy regarding this practice occurs as it is believed to contribute both negative and positive implications and dangers, not only to oneself but the environment as a whole. Genetic engineering increases the agricultural economy, the yields of agricultural produce, and also causes negative effects on the ecosystem. Genetic engineering enhances plant resistance to drought, salinity, disease, pests and herbicides. The aim is to try and enhance the growth, productivity, nutrient value, and chemical composition of the plants. Chemicals are constantly being developed or improved to enhance the competitiveness and adaptability of crops, and to kill the parasites and weeds which plague the agricultural sector. This however is not

always good as the plant and the pests then become resistant to these new chemicals defeating the purpose of it being used. The new chemicals which are produced to kill these strong pests and weeds may be more harmful to other plants and remove nutrients within the soil in turn reducing the yield of agricultural crops.

Genetic engineering in today's world is gaining much importance. It provides plant varieties with good agronomic characteristics, superior quality values and expressing traits of agricultural interest such as insect resistance and herbicide tolerance. The production and use of genetically modified organisms (GMO's) is increasing steadily. There are various techniques by which genetic modified crops can be developed. But the issue still remains; whether altering genetic structure of any organism is ethical, will it create any problem to the people who consume it. Therefore, it is important to examine both pros and cons of genetic engineering and to determine whether this technology have place in a future. There are lots of controversies regarding the safety issue of GM crops and labeling of GMO products. Environmental risk assessment is a structural approach use to analyze the risk associated with GM crops. The

goal of the risk assessment is to identify, characterize and evaluate risks by considering a wide range of potential pathways through which harm might occur. The assessment evaluates any risks posed by the genetic engineered (GE) plant in comparison to the risks posed by non-GE plant

Looking at the fact that genetic engineering employs viral vector that carries functional gene inside the human body; the repercussion are still unknown. There are no clues as to where functional genes are being placed. They may even replace the important genes, instead of mutated genes. Thus, this may lead to another health condition or disease to human. Also, as defective genes are replaced with functional gene, then it is expected that there will be a reduction in genetic diversity and if human beings will have identical genomes, the population as a whole will be susceptible to virus or any form of diseases. Many questions regarding the ethical and moral issues related to genetic engineering in humans have been raised. These involve inquiries related to whether man should interfere with the natural course of life and suffer unknown consequences. Our understanding of human genetics is at a very initial

stage. At this level, it might not be a very good idea to use gene therapy as an alternative for conventional methods of treatment of diseases.

Genetic engineering on animals is highly undesirable, unnatural and therefore unethical. Some rationalists believe that it is tantamount to tinkering with nature's pre-planned programme. Once modified, the individual genetic 'personality' of the animal stands irreversibly altered. It is used against the well-being of animals rather than for their welfare.

Many people also think that this new biotechnology is letting scientists and doctors play god. These doctors are not trying to recreate human science; they are just trying to perfect its flaws. Doctors and scientists have already helped diabetics with their synthetic insulin, and infertile parents are now able to have children. Those that oppose genetic engineering because doctors are trying to play god, do not realize what genetic engineering has already contributed to our world. Society should research issues before forming an ignorant opinion.

Another opposing view to genetic engineering is the idea that doctors and genetic engineers are trying to control something that man was not supposed to be able to control. These ideas stem from people's fear and religious affiliation. This is based on opinions that people have formed, once again, because of their ignorance towards genetic engineering.

The fear that people have toward genetic engineering is not new to science. Ever since the beginning of science, man has been afraid of the unknown. Space travel and flying were not widely accepted until the twentieth century and was completely absurd just one hundred years ago. Today they are widely accepted and are used every day. Genetic engineering is in the first stage of its discovery and will emerge in the twenty first century and will be as accepted as is flying and space travel. The people of the world should ease up on holding back the evolution of science and realize its possibilities for future generations. Besides all the possible advantages or improvements every scientists should always consider the risks and consequences of genetic manipulations before starting any research in this area.

**References:**

- <https://www.britannica.com/science/genetic-engineering>
- <https://vittana.org/13-advantages-and-disadvantages-of-genetic-engineering>
- <https://agricultureandfoodsecurity.biomedcentral.com/articles/10.1186/2048-7010-2-15>
- <https://humanparagon.com/genetic-engineering-examples/>

**Additional Reading:**

- <https://www.nytimes.com/2019/02/23/opinion/green-new-deal-climate-democrats.html>
- <https://www.nytimes.com/2019/02/26/opinion/title-x-rule.html>
- <https://www.theguardian.com/commentisfree/2018/oct/30/the-guardian-view-on-taxing-tech-needed-and-fair>
- <https://www.theguardian.com/commentisfree/2019/jan/11/the-guardian-view-on-universal-credit-flawed-calculations>