Agricultural biotechnology and importance.

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DESCRIPTION

Agricultural biotechnology is a set of tools that includes traditional breeding techniques that modify an organism or part of an organism to manufacture or modify a product. Improve plants and animals. Or develop microorganisms for specific agricultural purposes. Agriculture and its related sectors is the mainstay of almost half of India's population and contribute significantly to the country's socio-economic structure. The intensification of agriculture has led to an unprecedented increase in food production that has made India self-sufficient. However, the sustainable growth of agricultural production and productivity has become a priority due to multilateral challenges due to population growth, climate change and related bio-non-biological stressors, shrinking cultivated land and natural resources.

Due to the complex problem of hidden hunger, proper food supply is no longer a reason for complacency, and therefore puts more value on food security. Despite these challenges, India has significant advantages in terms of its rich biodiversity and vast pool of staff. Plant biotechnology has helped improve plant productivity by improving food, feed and fiber safety and reducing the ecological footprint of agriculture. Breakthroughs in molecular biology, including genomics, proteomics, and genomic engineering editing, offer incredible economic, environmental, and social opportunities to lead current and future agricultural research.

Genetic engineering of crops to improve agronomic and nutritional properties has been widely discussed in the literature. In short, genetic engineering involves introducing new traits into crops by manipulating the genetic material. Since transgenic or Genetically Modified (GM) plants have been marketed in the United States since 1996, genetic material can be integrated into the plant genome by transformation *via Agrobacterium* or administration of microscopic guns. A well-known example of a transgenic plant is golden rice, which expresses beta-carotene and is charitably created to reduce Vitamin A Deficiency (VAD) in developing countries. Plants that express genes from closely related wild relatives are also created to preserve the resistance genes lost in years of domestication of crops. For example, the Stem Srust initiative is currently producing a cisgenic version of wheat with several genes resistant to the fungal pathogen Puccinia graminis from wild relatives.

The third technology under the field of genetic engineering is RNA interference or RNAi technology. In this case, the plant needs to produce antisense RNA for a particular gene, whose expression is blocked by gene silencing. An example of the use of this technology is GM papaya, which is resistant to papaya ring spot virus. This technology is responsible for saving the Hawaiian papaya industry. Recently, a new technology called gene editing has come to the fore. Genetic modification does not require the introduction of new sequences, but it only results in one or two nucleotide changes in the plant genome and is therefore exempt from regulations that regulate the production of genetically modified organisms. Examples of genetically edited plants are not currently commercially available, but much research has been done in this area and this biotechnology approach will enable many new plant varieties in the coming years.

It should also be noted that many of the plant varieties available today were created by mutagenesis breeding. Mutagenesis, which is not considered a form of genetic engineering, involves the introduction of random mutations into plant cuttings by chemical or radiation mutagenesis. Explants that express new functions are then propagated from these mutagenesis events. According to the mutagenesis database, over 17,000 plant varieties have been developed by mutagenesis breeding. Both ruby red grapefruit and single malt scotch are derived from mutagenetic breeding.

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