

# USE OF BIOTECHNOLOGY AS AGRICULTURE

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## INTRODUCTION

Biotechnology involves the use of approaches related to science to enhance the value of different kinds of living beings.

Biotechnology involves synthesis of genes. Genes are responsible for development of organisms. Thus, changes in the genes takes place due to which agricultural biotechnology are able to attain the desired plants. Plants, animals, and microorganisms are enhanced due to different scientific techniques involved in agricultural biotechnology.



## WHY AGRICULTURAL BIOTECHNOLOGY ?

- Higher agricultural productivity.
- Enhancements in crops and livestock.
- Enhancing traditional crossing of closely related species.

Agricultural biotechnology has been practised for years for the growth and development of the agricultural industry. Selection and breeding is practised for attaining desirable characteristics of plants and animals.



## APPLICATIONS

- Genetic engineering** – Involves genetic changes and manipulation using biotechnology. Leading to increase the rate of production of crop further decreasing crop harm from unwanted plants and foreign agents.
- Molecular markers**—Can be used to identify desired features in plants and animals even after the absence of visible traits. Thus making the process of breeding more accurate.
- Molecular diagnostics**—Gene products and specific genes which are precise and accurate are being detected. Molecular diagnostics in the

field of agriculture enables to accurately identify the crop diseases.

- Vaccines**—Biotechnology derived vaccines are much more better, safer, and less in price in comparison to vaccines that are available from 20th century. They can be kept at room temperature and further making it easier to store.

- Tissue culture**—Regeneration of a new plant from disease free parts of plants in the wet laboratory. Thus allowing the breeding of disease free parts of plants for crop production. Examples of different crops that are produced using the method of tissue culture include mango, papaya and pineapples etc.





•**Flowers**—The attributes such as colour , smell,and size etc of flowers can be improved through identifying the gene and involving use of transfer techniques. Thus improving ornamental plants through the use of biotechnology. Some examples of ornamental plants involve the snake plant and silver nerve plant etc

## BENEFITS



Upon implying techniques of genetic engineering to agricultural biotechnology.

•Higher amount of production of crops occurs,due to the ability of disease resistance and higher tolerance to drought , scientists can specifically select genes for disease resistance from any other species and transfer into the essential crops. Thus making the essential crop resistant against the particular disease.



•Improved crop protection in crops such as corn , cotton,and potato etc . These crops are provided with cost friendly solutions to make a protein that kills specific insects when they feed themselves on the particular plant by the method of genetic engineering.





- Nutritional value, flavour and texture of foods is improved. Transgenic crops which are the plants that have been artificially pollinated involves examples such as Soyabeans which has increased content of protein , potatoes with increased starch content and beans with more important amino acids.

- Flavour can be enhanced by the activity of enzymes in plants by precursors of aroma transforming into flavoured compounds.

- Improved storage properties of crops can be observed as a result of genetic engineering. Thus providing highly nutritious foods and further averting damage , decay, and loss of nutrients.

- Lesser is the pesticide dependence due to genetic engineering , it decreases residues of pesticides in food , lesser leaching of pesticides in groundwater enabling to not cause water pollution and further reduce the exposure of farm workers to the products that are harmful.

- In Developing countries health conditions can be improved.

- Enables improved tolerance of herbicides by the use of genetically engineered crops which further is responsible for controlling weeds. Thus making weed management much easier and also enabling the use of less amount of chemicals in agricultural fields. This would lead to decrease in soil erosion and further adapting soil conserving practices.

- Providing resistance to the viral diseases. Often the plants are affected by viruses which are spread by insect vectors from plant to plant in agricultural field. For example. Aphids

Researchers have encountered new genetic engineering methods which is responsible for providing resistance or protection against the viral disease.

- Improving the shelf life of fruits, which is responsible for delaying the process of ripening. Genetically engineered fruits thus have improved and better shelf life. Making the fruits last longer for the consumers

## DISADVANTAGES

- Issues related to health - It increases the risk of allergens and toxins in healthy foods. It will also provide antibiotic resistance which will raise new antibiotic resistant strains of bacteria .This would lead to rise of diseases making genetic engineering a medical concern.

- Issues related to ecology and environment–Certain researchers believe that transgenic crop may cross pollinate with weeds and would further lead to production of “Superweeds” which would be more difficult to control. Further adaptation of insecticide resistance would lead to formation of resistant pest populations. Also the major concern involves the loss of biodiversity.

- Certain social issues also come into role when some people believe that genetically engineered products should have special label on it . Also farmers those who are growing hybrid varieties in their field are required to buy new seeds annually as the hybrid seeds will not produce plants identical to the parent plant.

## CONCLUSION

There is the need for development of impactful biosafety systems to encourage the biotechnologies ensuring safe new products; and to further build public believe that the products in the market are safe. Thus there should be development of proper framework to enhance the ability of public and private sectors in the field of biotechnology. Also encountering the issues related to biotechnology leading to the adaptation of most appropriate approach.

