International Scholars Journals

Frontiers of Agriculture and Food Technology ISSN 2736-1624, Vol. 13(1), pp. 001-002, April, 2023. Available Online at www.internationalscholarsjournals.com © International Scholars Journals

Perspective

The use of Crop Modification Techniques and Agricultural Biotechnology

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Received: 17-Dec-2022, Manuscript No. FAFT-22-83907; Editor assigned: 20-Dec-2022, Pre QC No. FAFT-22-83907 (PQ); Reviewed: 04-Jan-2023, QC No. FAFT-22-83907; Revised: 27-Mar-2023, Manuscript No. FAFT-22-83907 (R); Published: 04-Apr-2023

DESCRIPTION

Agricultural biotechnology or agritech is a branch of agricultural science that focuses on modifying living things, such as plants, animals, and microorganisms, using scientific tools and methods. These include genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture. One area of agricultural biotechnology that has advanced significantly in recent years is crop biotechnology. The desired trait is transferred from one crop species to another, and vice versa. The flavor, flower color, development pace, size of the harvested goods, and disease and pest resistance of these transgenic crops are all desirable traits. For generations, traditional crossbreeding has been utilized to increase crop quality and yield. By mating two sexually compatible species, crossbreeding produces a new and unique variation with the desired characteristics of the parents. For instance, the honey crisp apple has a particular texture and flavor as a result of its parents crossbreeding. Traditional methods involve applying pollen from one plant to the female portion of another, creating a hybrid that has the genetic makeup of both parent plants. Plant breeders choose the plants that have the features they want to pass on and keep breeding those species. Keep in mind that crossbreeding is only effective between members of the same or closely related species.

In the DNA of any creature, mutations can happen at random. Scientists can haphazardly introduce mutations into plants to produce variation in crops. Radioactivity is used in mutagenesis to cause random mutations in the hopes of discovering the desired phenotype. Radioactivity or modifying chemicals like ethyl methanesulfonate can be used by scientists to introduce random mutations into DNA.

Crops are mutated in atomic gardens. A circular garden with an elevated radioactive core in the middle emits radiation into the surrounding plants, causing mutations within a specific radius. Ruby red grapefruits were created through a procedure called radiation induced mutagenesis. In order to alter a crop's fertility or size, polyploidy can be produced to change the number of chromosomes present in the crop. Typically, organisms are diploid, or have two sets of chromosomes. However, the number of chromosomes can alter, either naturally or by the use of chemicals, leading to changes in fertility or crop size. In order to produce a sterile (seedless) watermelon with three sets of chromosomes, a 4 set chromosome watermelon is crossed with a 2 set chromosome watermelon.

To satisfy the needs of a growing population, agricultural biotechnology has been employed to enhance the nutritional value of a number of crops. Crops made through genetic engineering can have more vitamins. Golden rice, as an illustration, possesses three genes that enable plants to create substances that are transformed into vitamin A in the human body. Crops can also be genetically modified to generate kinds with allergies removed or to lower toxicity. For thousands of years, weeds have been a problem for farmers since they compete with crops for soil nutrients, water, and sunlight and can be fatal. Herbicide tolerance is a remedy provided by biotechnology. Herbicide resistant crops are prevented from thriving by eliminating weeds and their competition through the direct application of chemical herbicides to plants.

Frequently, diseases spread by insects affect crops like aphids. Until recently, the only way to limit the spread of illness among crop plants was to entirely remove the damaged crop. Through the use of genetic engineering to create virus resistance, the discipline of agricultural biotechnology provides a remedy. Cassava, maize, and sweet potatoes are now being developed as genetically engineered disease-resistant crops. Additionally,

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agricultural biotechnology can offer plants in high temperature environments a solution. Genes that assist regulate cold and heat tolerance can be altered to increase production and reduce crop death. For instance, tobacco plants have been genetically altered with genes originally identified in *Carica* papaya to be more adaptable to hot and cold temperatures. Other characteristics include salt tolerance, nitrogen usage efficiency, and water use efficiency.