

PLANT BIOTECHNOLOGY AND ITS ROLE IN NUTRITION AND DEVELOPMENT

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It goes without saying that necessity is the mother of invention. Thus when a need arises for introducing a change in the society for its amelioration likeminded people (experts) come together to provide a solution. Biotechnology is the best answer for any type of problem which requires research and development. Biotechnology has been able to deliver its results at most of the time exceeding the expected ways. One of the branches of biotechnology is the plant biotechnology. Also known as agricultural biotechnology it is the use of a set of techniques and principles to develop plants (crops in agriculture) having a set of desired characteristics. The overwhelming problem of hunger in underdeveloped and developing countries to certain extent is combated using plant biotechnology. In the past few decades, the use of plant biotechnology in research and development has given rise to a lot of variation. Plant breeders across the world have cross linked genes and been cultivating plants with varied attributes. This had led to the existence of very few species of food plants holding on to their original genetic composition. With the use of all techniques and methods new varieties of plants and crops have been developed that has broadened the possibility to combat the world hunger problem by growing these varieties in comparatively harsh or different environmental conditions along with incorporation of the required dosage or number of nutrients to fulfill the basic nutritional requirements of the people residing in these places.

IMPACT OF PLANT BIOTECHNOLOGY

Bacillus thuringiensis (Bt) is the model organism used for developing insect resistant plants. Apart from that they also impart pesticide or herbicide resistance in plants or crops. Bt produces endotoxins that have the ability to perforate the lining of the gut of the disease causing organism thus leading to its death. It has also helped in the development of crops that resists mycotoxigenic fungi contamination. This proved to be very beneficial as the mycotoxins are carcinogenic and have the ability to cause severe damage to the brain, kidneys and liver of horses and farm animals.

a) High yield: These genetically modified crops have shown greater yield due as they have better resistance to insects, herbicide tolerance, nutrient retention capacity improved facilitates high yield due to weed control, economic strategies adaptation..

b) Pest management: With the help of Bt crops the pest

population can be under control. Due to the insects' resistance the need to use insecticides has substantially reduced. This has further helped in cultivation of the particular batch of crop for a longer period of time and also managed to make off season farming feasible. Herbicide tolerance has offered a variety of benefits to the crops, some of them being the increased single batch production and eliminating the need of using two or more or a group of complex chemicals for pest control. This leads to the decrease in pesticide use.

c) Enhanced condition for the non-target organism: The predatory species such as the ladybird beetle, spiders, bugs etc are to have increased population in the Bt crops. This is due to less use of insecticides. In return they have shown a high predatory rate for the secondary pest species which the Bt plants are unable to inhibit.

d) Sustainable farming: Bt crops and herbicide tolerant crops and plants are compatible with the farming system. They can be directly used for farming without the need for tillage (physical or mechanical removal of weed) or pre-plantation cultivation. The reduction in tillage renders the intact capacity of soil to be held together without loosening. This in return decreases soil erosion. These types of plants are an important part of Integrated Pest Management farming systems that helps farmers to incorporate sustainable farming.

NUTRITION AND AGRICULTURAL DEVELOPMENT

The development of transgenic plants with the help of plant biotechnology have introduced a new era of improvement and growth in the production sector. With the introduction of special characteristics plants are able to put an end to a lot of agriculture related problems. Plant biotechnology along with plant breeding has been able to provide resistance to lepidopteron pests. This has increased the genetic tolerance level of the plants and thus making it less susceptible to plant diseases along with almost complete eradication of pesticide use. The nutritional properties of certain crops have all shown overall improvement. GM papaya has resistance to Papaya Ringspot virus, a highly nutritious fruit that can be easily grown and in local and have cost effective production. GM sweet potato is highly nutritious too and due to its transgenic modification it can be grown in harsh conditions and also be beneficial for the developing countries. Golden Mustard incorporated with many nutrients can be used to reduce the malnutrition issue among children in poverty stricken areas.

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