

Biotechnology in Agriculture - A Review

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ABSTRACT

Majority of the population in developing countries earns their livelihood by agriculture. Food scarcity is one of the major problems faced by developed countries like India. The agriculture based economy like India depends on rain and other natural factors. The optimum use of available resources is key to development. Many modern fertilizers, liquid fertilizers are being explored for optimum use and economy. Biotechnology plays important role in the development of new breeds of plants and animals. The hybridization can be used to produce the new seed variety with maximum productivity. Studies by various researchers show that the issues such as food shortages, a burdened economy, political instability and poor environmental sustainability have badly affected green revolution and gene revolution.

Key words: Monoclonal antibodies, environmental sustainability, molecular techniques, genetic transformation.

INTRODUCTION

India is agriculture based country. Majority of the population earns their livelihood by agriculture. Food scarcity is one of the major problems faced by developed countries like India. The agriculture based economy like India depends on rain and other natural factors. The optimum use of available resources is key to development. Many modern fertilizers, liquid fertilizers are being explored for optimum use and economy. Biotechnology plays important role in the development of new breeds of plants and animals. The hybridization can be used to produce the new seed variety with maximum productivity. Also various new varieties of cow can be produced by gene manipulation. The biotechnology can also

be effective in pest control, insects and flies control and increasing fertility of the land. Current review summarizes use of biotechnology in agriculture.

A REVIEW ON BIOTECHNOLOGY IN AGRICULTURE

Woodward et.al. carried out studies on potential impact of biotechnology on development in Africa. ^[1] The issues such as food shortages, a burdened economy, political instability and poor environmental sustainability have badly affected green revolution and gene revolution. They emphasized the need to increase the efficiency of food production. 30% yield losses, according to them are caused by pests and diseases. An investigation was carried out by Srivastava and Kolady, on performance of the cotton sector and agricultural biotechnology industry in India. ^[2] They studied effect of Biotechnology on the yield. Their investigation provided long term trajectory of cotton crop. Izquierdo and Riva studied plant technology and its role in improving food security. ^[3] Tissue culture, recombinant DNA technology and monoclonal antibodies are some old and traditional applications of biotechnology. Recent application of biotechnology included genetic transformation, and marker-aided selection and breeding. Increasing demands in terms of food security, socio-economic development and promote the conservation, diversification and sustainable use of plant genetic resources are key applications which need to be addressed by biotechnology. Adenle et.al. carried out investigation on open source biotechnology in developing countries. ^[4] According to their studies, modern biotechnology research tools are not

accessible to poor countries. They carried out survey on existing open source literature. They proposed open source biotechnology framework (OSBF) for dealing with intellectual property right (IPR) challenges. They also studied potential impact of open source biotechnology. According to studies carried out by Wieczorek there is the need to consider use of transgenic organisms very carefully. [5] Careful and ethical use of biotechnology has the potential to provide important benefits. A balanced view of the fundamentals of biotechnology and genetic engineering can help in better use of biotechnological studies. According to a review carried out by Sharma et.al, the conventional crop improvement has been augmented by using Recombinant DNA technology. [6] They expressed need to present the benefits of biotechnology to the general public in a real and understandable way. Ayobami et.al. carried out studies on recent advances in the use of modern biotechnology in agriculture. [7] They emphasized the need for a well scrutinized and checkmated biotechnology practice. According to Job, the technology for plant genomes has progressed during the past few years. [8] They found that many useful modifications can be carried out in advanced biotechnology such as improving the nutritional conditions for animals and humans. These modifications may include yield increase, correction of nutritional deficiency, elimination of antinutritional components, vitamin intake. Moula carried out extensive studies on crop biotechnology. [9] His studies were focused on studying ethical aspects of use of biotechnology in agriculture. According to him, ethical tools makes biotechnology better tool for human beings. Herdt discussed key consequences of DNA-based molecular techniques and their application for farmers and the public. [10] He reiterated the fact that food production, nutrition, or farm incomes in less-developed countries can be increased through cost effective methods by application of biotechnology. Halos studied

the need for strategic approach in biotechnology in Philippines. [11] According to him two key aspects of biotechnological development are development of biotech products and the development of the regulatory framework for biotech products. Microorganisms and animals modified for medical applications are more accepted than genetically modified food plants. Ives et. al. studied agricultural biotechnology and discussed related contemporary issues. [12] According to them, one major advantage of biotechnological development is that it has ability to generate generic strategies which can lead to crop improvement. Hera and Popescu discussed role of biotechnology for sustainable agriculture development. [13] The regional cooperation, according to them can go long way to fulfill agricultural needs, priorities and practices. Rajaram discussed role of conventional plant breeding and biotechnology in future wheat production. [14] According to him, the aspects such as improvement in yield potential, disease resistance need to be addressed properly in order to increase plant and crop production. Zilberman et.al. discussed economic and international implications of agricultural biotechnology. [15] They discussed application of medical biotechnology for agriculture. From biotechnological perspective, they discussed basic analytical considerations and methodological issues.

CONCLUSION

Many studies indicate that the issues such as food shortages, a burdened economy, political instability and poor environmental sustainability have badly affected green revolution and gene revolution. Recent application of biotechnology, according to many researchers, included genetic transformation, and marker-aided selection and breeding. Increasing demands in terms of food security, socio-economic development and promote the conservation, diversification and sustainable use of plant genetic resources are key applications which need to be addressed by biotechnology.

Microorganisms and animals modified for medical applications are more accepted than genetically modified food plants.

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