Seminar III

Transgenic Crops for Human Welfare

Dr. M.S.R. Bhuiyan[1]

Summery

During the last two decades, it became possible in plants to transfer isolated or altered genes through genetics engineering methods, leading to the production of transgenic plants and in some cases transgenic crops. The production of transgenic plants or crops requires the use of recombinant DNA techniques where genes are being spliced from a source and are introduced into the host either directly or through some vectors. Herbicide resistant cultivars are developed to make successful use of herbicide to kill selectively weeds only without affecting crops. By transferring crystal protein gene (cry gene) from *Bacillus thurengiensis*, popularly known as genes for Bttoxins, into the crops, cultivars are developed which show much more resistant to some insect species of the order Lepidoptera, Coleoptera and Orthoptera. Lack of efficient techniques of developing stable resistance mechanisms against virus diseases through conventional breeding methods encouraged the scientists to incorporate virus resistance genes from distantly related species into crop varieties by the use of genetic engineering. Transfer of gene from virus coat or capsid protein (cap) from virus to crops has resulted transgenic crops in some crops which show very low and delayed symptoms of viral attack. Use antisense gene in tomato resulted cultivars which show a) delayed ripening by introducing gene which suppresses the synthesis of ethylene and b) higher shelf life of tomato due to alteration of the softening nature of tomatoes by introducing genes from other sources which suppress the fruit cell wall degrading enzymes. Three genes from two different sources are introduced into rice plants to produce pro-vitamin A rich rice crop. Some success has been achieved in the modification of the seed protein quality, engineering fatty acid composition of oil crops for improving oil quality or increasing the production of higher amount of desired type of fatty acid for industrial use. Attempts are being taken to produce C_4 rice crops by incorporating three maize genes into rice crop. Japanese scientists have already introduced one of the three genes into rice plants which showed 35% yield increase in rice. Both male sterility gene and fertility restoration genes are introduced from bacteria to crop which are now being used

[1] Professor, Department of Genetics and Plant Breeding, Sher-e-Bangla Agricultural University, Dhaka

in some of the crops where male sterility system is absent. Transgenic plants and/or crops are developed which act as bio-reactors to produce some novel compounds. Attempts are being made to develop fruits which would act as edible vaccines. Use of transgenic crops for human food raises some questions from scientists as well as environmentalists. Thus proper testing and monitoring are needed to make safer use of this wonderful technology based crops.