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DNA-based GMO screening strategies: Rapid monitoring the GM status of products in food and supply chain

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More than 20 genetically modified (GM) food crops comprising 75 percent of globally commercialized GM events have been approved for use as food (direct or in processed form) or for cultivation. In India, several GM events of food crops including brinjal, corn, cabbage, cauliflower, chickpea, groundnut, mustard, okra, papaya, rice, *sorghum*, soybean, sugarcane, tomato, watermelon, wheat have been under field trials at Biosafety Research Levels-I and II or imported for research purposes. Efficient DNA-based GMO screening strategies have been developed which would assist in reducing the number of samples to be tested for further confirmation tests, thus cutting down the overall cost of GM testing. GMO matrix has been developed as decision support system to select screening assays for testing range of GM events. Multiplex PCR assay targeting commonly employed marker genes and duplex Real-time PCR assay targeting regulatory elements have been developed for testing the GM status of a sample, irrespective of specific GM trait and crop. TaqMan® Real-time PCR based Multi-target System simultaneously detecting 47 targets has been developed for rapid screening of GM food crops. Visual and Real-time Loop-mediated Isothermal Amplification (LAMP) assays targeting promoters, marker genes and transgenes have been developed which could facilitate rapid on-site GM detection at port of entry or in farmers' fields when combined with fast DNA extraction kit. The developed strategies would also be employed by GMO testing laboratories in the country as per the availability of resources and scope, to test the GM status of food crops and products.

Biography

Monika Singh is presently working as Scientist at ICAR-National Bureau of Plant Genetic Resources, New Delhi, India and she has been actively engaged in the area of development of molecular diagnostics for detection, identification and quantification of genetically modified (GM) crops. She has expertise in the development of rapid, cost-effective and reliable GMO screening technologies based on GMO matrix, Loop-mediated Isothermal Amplification, Multi-target Taq®Man Real-time PCR-based approach and multiplex PCR. She has completed her PhD in Biotechnology and Molecular Biology from CCS Haryana Agricultural University, Hisar. She has more than 30 research publications in peer-reviewed national and international journals.

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