

7th Indo-Global Summit and Expo on **Food & Beverages**

October 08-10, 2015 New Delhi, India



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Genetically modified crops and DNA based GM diagnostics: Emerging scenario and challenges ahead

Biotechnological approaches including prospecting of genes for abiotic and biotic stress tolerance, marker-assisted selection and genetically modified (GM) crops can speed up the breeding programs. Remarkable progress has been made for the development and adoption of GM crops in more than 28 countries with 381 GM events of 29 crops covering 180 million hectares under GM cultivation in 2014. India ranks fourth for area under GM cultivation of Bt cotton in more than 11.6 million hectares. With the pivotal role being played in tackling food security by the GM crops, there is need to allay the consumer concerns related to GM food products for regulatory compliance and to solve legal disputes. Reliable and cost-effective GM diagnostics are a pre-requisite for the same, which would further address risk assessment/management strategies and post-release monitoring issues, effectively. A cost-efficient testing strategy, GMO matrix has been developed for 141 GM events of 21 crops with 106 genetic elements for rapid screening and detection of large number of GM events. Real-time PCR, Multiplex PCR and loop-mediated isothermal amplification (LAMP) based GMO screening technologies targeting commonly employed genetic elements have also been developed to check GM status of a sample irrespective of GM crop/trait in a rapid and cost-efficient manner. In India 18 GM detection laboratories are there in public and private sector, out of these 13 are NABL accredited (2 public and 11 private sector). These laboratories are catering the huge demand for certification/testing of GM-free status in the samples of export. Further, close knit network of GM diagnostic laboratories needs to be brought up in collaboration with the regulatory bodies to build up a robust and sound mechanism for regulatory compliance and ensuring public confidence in GM crops to harness their benefits for the society.

Biography

Gurinderjit Randhawa has completed her PhD in Molecular Genetics from University of Dundee and Scottish Crop Research Institute, Scotland, United Kingdom. She is the Principal Scientist at Genomic Resources Division, NBPGR; New Delhi and served for Indian Council of Agricultural Research, New Delhi for more than 29 years in different capacities. She was instrumental in establishing National Containment Facility of CL-4 level and GM detection laboratory of international standards and developed cost-effective and robust DNA-based diagnostics for 13 GM crops. She has also made significant contributions in DNA profiling and molecular characterization of rice, chickpea and eight medicinal plants of commercial importance. She has three granted patents and more than 60 research papers to her credit

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