

PRESS NOTE

on the occasion of release of

Diagnostic Kit for Rapid Detection of Genetically Modified (GM) Foods*

*** For detection of recombinant *cryIA(c)*, *cry2A(b)*, NOS-T, CaMV 35S promoter and *npt II* genes in seeds (crushed or whole) of rice and cotton**

[Technology developed at the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad with the support of Department of Biotechnology, Ministry of Science and Technology, Government of India]

As part of an inter-institutional collaborative and cross-validation effort supported by the Department of Biotechnology (Ministry of Science & Technology, Government of India), the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad has developed a Diagnostic Kit for Rapid Detection of Genetically Modified (GM) Foods pertaining to the widely grown and used crops, rice and cotton.

Background:

One of the outstanding accomplishments of modern biotechnology in the twentieth century has been the development of Genetically Modified Organisms (GMOs): also referred to as transgenics, they are genetically engineered organisms that manifest a novel trait by encoding the product of an artificially inserted gene which either protects the organism from insect pests or enhances its adaptability to barren environments. In agriculture, transgenic crops are being grown today over an area of 100 million hectares throughout the world. Presently, India ranks 5th in the world in transgenic crop production with over 5 million farmers growing transgenic cotton, popularly known as Bt-cotton, covering 6.2 million hectares in different parts of the country. To date, Bt-cotton is the only commercially approved transgenic crop in the country, while the introduction of transgenic versions of other economically important crops like rice, tomato, potato, soybean, etc are sought to be introduced in the near future.

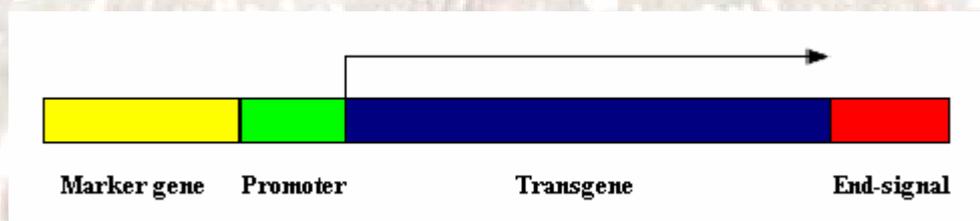
With the increasing extent to which GM crops are being cultivated and produced, the suitability and safety of these crops has been a matter of serious debate in recent years. Biosafety assessment of GMOs requires not only an evaluation of their environmental impact but also an assessment of the risks that GM foods may pose for health of the consumer. Several countries have accordingly come up with appropriate labeling methods for GM crops and GMO-derived food products.

CDFD's Technology:

The Diagnostic Kit that has been developed at the CDFD is validated for detection, from whole or crushed seeds, of pest-resistant Bt-cotton and Bt-rice crops (that is, which have been genetically modified to express the *cry1A(c)* and *cry2A(b)* transgenes from the bacterium *Bacillus thuringiensis*). The two transgene products confer resistance to insect pests of the families Lepidoptera and Diptera, respectively.

Approach to detection:

Briefly, GM crops differ from non-GM crops in that their genetic make-up has been altered by the artificial introduction of a “transgenic cassette” as depicted schematically below:



Schematic depiction of the elements in a transgenic cassette

The Diagnostic Kit developed by the CDFD employs the “Polymerase-Chain-Reaction (PCR) technique” for rapid detection of the following five elements in the transgenic cassettes introduced into Bt-rice or Bt-cotton crops:

Promoter	-	CaMV 35S promoter
Transgene	-	<i>cry1A(c)</i> or <i>cry2A(b)</i>
Marker gene	-	<i>npt II</i>
End-signal	-	NOS-T

The detection of four of these elements is based on primers designed indigenously in CDFD and cross-validated by other national laboratories, and that of the fifth (CaMV 35S promoter) is based on primers designed to ISO standards that are also soon to be adopted by the Bureau of Indian Standards, Government of India. These tests have been shown to be useful in detecting GM-cotton or GM-rice seeds at an admixture as low as 0.04% with non-GM seeds.

The CDFD is also undertaking R&D for preparation of Diagnostic Kits for detection of additional GM foods, namely, brinjal, corn, mustard, peanut, papaya, potato, soybean and tomato.

[For further details, please visit www.cdfd.org.in or contact Dr J Nagaraju (jnagaraju@cdfd.org.in)]