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Event-specific detection system for the brazilian GM common beans embrapa 5.1 resistant to a geminivirus

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Brazil is the world's largest producer of common beans. Despite this fact, this crop is susceptible to a geminivirus that affects its productivity. The bean golden mosaic virus - BGMV is the most severe phytopathogen of this crop causing great production losses in beans of 40 to 100%.

The genetically modified common bean Embrapa 5.1, developed by Brazilian Agricultural Research Corporation (Embrapa), is the first transgenic geminivirus-resistant in the field and it is also the first GM plant produced in Latin America. A RNA interference construction was used for developing the Embrapa 5.1 event. This product produces a specific siRNA designed to induce post-transcriptional gene silencing for the rep viral gene, resulting in strong resistance to BGMV.

The post-market monitoring of GMO requires detection and quantification tools in order to attend the current Brazilian regulation that requires the labelling of food containing up to 10 g·kg⁻¹ threshold of GMO. The GM event-specific PCR method has been the primary trend for GMO identification and quantification because of its high specificity based on the flanking sequence.

In this work, primers and probe targeting an event-specific DNA sequence of Embrapa 5.1 GM common bean was developed. The primers and probe showed high specificity for the target detection. The method showed suitable efficiency (about 100%) to be used as an event-specific detection system of GM common bean Embrapa 5.1 for future assessment and monitoring of this GMO worldwide.

Keywords: Event-specific detection, Real-time PCR, GMO monitoring