

COMPARISON OF SCREENING METHODS FOR RELIABLE DETECTION OF GENETICALLY MODIFIED ORGANISMS

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Abstract

Three PCR primer pairs suitable for common regulatory elements of genetically modified organisms (GMOs) were compared for selection of the most effective screening method for GMO. Two of the primer pairs 35S1/35S2 and 35S-cf3/35S-cr4 are specific to 35S promoter from Cauliflower Mosaic virus and NOS1/NOS2 is specific to the NOS terminator from *Agrobacterium tumefaciens*. The Roundup Ready soybean was used as GM material. The comparison of the primer pairs was carried out in two different PCR conditions PCR1 and PCR2. The results obtained exhibited 35S promoter specific primer pair 35S-cf3/35S-cr4 as the most specific, sensitive and efficient tool for GMO screening in the both PCR conditions applied.

Keywords: Screening of GMO, genetically modified organisms (GMOs), PCR analysis, regulatory elements.

Introduction

The intentional modification of plant genetic material by recombinant DNA technology has resulted in the development of genetically modified organisms (GMO). They are also called transgenic plants and products of biotechnology. GMOs occur as seeds, plants, grains, food and feed. The introduction of candidate genes into the plants and their regulated expression generated GMOs with useful traits, such as: herbicide tolerance (Roundup Ready), insect resistance (Bt), resistance to illness, high yield, resistance to extreme conditions, etc. [Popping, 2002], therefore they have significant agronomical and commercial interests. The vast proportion of GM crops grown commercially in the world has been accounted for by four species: soya, maize, cotton and rapeseed. To date, 107 GM-events of 21 crops have been approved in different countries and new GM-varieties are added annually [ISAAA Brief 37-2007]. However, unregulated distribution and use of GMOs may pose serious threat to environment, human and animal health. Correspondingly, development of reliable GMO detection methods for monitoring of biotechnological products is in urgent need.

There is particular interest in the GMO screening methods due to the increasing number of transgenic events. GMO Screening determines if a sample contains a GMO material or not, correspondingly screening tests are targeted to the GMO common elements. The standard polymerase chain reaction (PCR) based screening method detects 35S promoter from Cauliflower