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Detection of authorized genetically modified maize events: Participation in an inter-laboratorial study

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The soybean and maize are the most important genetically modified (GM) crops (57% and 25% of global biotechnological planted area, respectively) [1]. The need to monitor and verify the presence of biotechnology-derived material in food products demands analytical methods able to detect, to identify and to quantify either the introduced DNA or the expressed protein(s). The interest of USDA/GIPSA Proficiency Program is to perform accurate, reliable, and reproducible testing on biotechnology-derived events. The objective of this Program is to detect and quantify GM maize and soybean flours by means of DNA and/or protein based methods to verify the performance of several laboratories of individual organizations.

The aim of the present work was the detection of GM maize events of six ground maize samples supplied by the Proficiency Program in two periods. The samples were received with the information of 11 specific GM events ranging from 0 to 5%. DNA molecules were the target compounds for GMO detection due to the higher sensitivity of DNA-based methods and to their higher stability compared to proteins. DNA was extracted by two different methods [2]: CTAB and Wizard. Yield and purity of DNA extracts were assessed by spectrophotometry, while amplifiability was evaluated by PCR targeting the invertase gene. DNA extracts were amplified by two polymerase chain reaction (PCR) techniques: qualitative PCR and real-time quantitative PCR. Several qualitative PCR techniques were performed to screen the 35S promoter sequence and to detect six GM events: Bt11, MON810, E176, GA21, NK603 and MON863. A real-time PCR assay with TaqMan probes was performed to quantify MON810. The results received by the first period of the Program showed good performance of the Laboratory of Bromatology to screen GM events by targeting the 35S promoter and by the detection of Bt11, E176 and MON810. Concerning the second period of the Program, where the other events were tested for the first time, the results are not yet available.

References:

[1] James, C. (2006), *Global Status of Commercialized Biotech/GM Crops:2006*, ISSAA Brief No. 35, New York, Ithaca: ISSAA.

[2] Mafra, I., Silva, S.A., Moreira, E.J.M.O., Ferreira da Silva, C.S., Oliveira, M.B.P.P. *Comparative study of DNA extraction methods for soybean derived food products*, Food Control (submitted).