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SIMULTANEOUS IDENTIFICATION OF WHEAT, CORN AND SOY INGREDIENTS IN FOODS

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Wheat (*Triticum aestivum* L.), corn *(Zea mays* L.), and soy (*Glycine max* L.) are widely used as raw materials, ingredients and additives in modern food production. The objective of this study was reliable and fast detection of wheat, corn and soy for food authenticity and safety assessment. To this purpose, multiplex polymerase chain reaction (PCR) technology was applied. New PCR primers targeting wheat low-molecular-weight glutenin subunit, wheat granule-bound starch synthase I (GBSSI) gene Wx-D1, corn invertase and zein genes as well as soybean lectin gene were designed. Genomic DNAs were isolated and purified from each crop and foodstuff. Species specific DNA markers were identified after optimization of uniplex PCR conditions. The specificity of the primers was assayed by PCRs with different plant species, namely wheat, corn, soybean, oats (*Avena sativa*), and barley (*Hordeum vulgare* L). Gel electrophoresis of the amplification products demonstrated high specificity of primer pairs for identification of relevant species. Subsequently, based on the developed DNA markers, the species-specific triplex PCRs were developed and optimized for instantaneous finding of these three plant species. Multiplex PCR analysis of different foodstuffs enables specific, effective and rapid detection of corn, wheat and soybean in processed foods. The results obtained indicate that the developed PCR methods may be used for accurate and simultaneous identification of wheat, corn and soy ingredients in foods.

Keywords: Food ingredients, authenticity, DNA markers, polymerase chain reaction

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