

Safety Assessment of Roundup Ready® Corn Event NK603

Executive Summary

Using modern biotechnology, Monsanto Company has developed Roundup Ready® corn plants that confer tolerance to glyphosate, the active ingredient in Roundup® agricultural herbicides, by the production of the glyphosate-tolerant CP4 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) proteins. Glyphosate kills plants by inhibiting the enzyme EPSPS. This enzyme catalyzes a critical step in the shikimic acid pathway for the biosynthesis of aromatic amino acids in plants and microorganisms, and its inhibition leads to the lack of growth in plants. The CP4 EPSPS proteins have a low affinity for glyphosate compared to the wild-type EPSPS enzyme. Thus, when corn plants expressing the CP4 EPSPS proteins are treated with glyphosate, the plants continue to grow. The continued action of the tolerant CP4 EPSPS enzyme provides the plant's need for aromatic acids. Aromatic amino acid biosynthesis is not present in animals. This explains the selective activity in plants and contributes to the low mammalian toxicity of glyphosate. Two copies of the *cp4 epsps* gene were introduced into the corn genome to produce Roundup Ready corn event NK603. The *cp4 epsps* gene derived from the common soil bacterium *Agrobacterium* sp. strain CP4 encodes for the naturally glyphosate-tolerant EPSPS protein.

The food and feed safety of corn event NK603 was established based upon: the evaluation of CP4 EPSPS activity and homology to EPSPS proteins present in a diversity of plants, including those used for foods; the low dietary exposure to CP4 EPSPS; the rapid digestibility of CP4 EPSPS; and the lack of toxicity or allergenicity of EPSPSs generally and by safety studies of the expressed CP4 EPSPS proteins. The equivalence of corn event NK603 compared to conventional corn was demonstrated by analyses of key nutrients including protein, fat, carbohydrates, moisture, amino acids, fatty acids, and minerals. Nutritional equivalence of corn event NK603 compared to conventional corn was confirmed by evaluation of the feed performance in broiler chickens and a rat feeding study, which included clinical and histological evaluations. The environmental impact of Roundup Ready corn is comparable to conventional corn. Glyphosate-tolerant volunteer corn is infrequent and easily managed in the farmer's field. The results of all these studies demonstrate that corn event NK603 is comparable to traditional corn with respect to food, feed and environmental safety.

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