



Karen McIntyre, Director General, Food Directorate, Health Products and Food Branch

Cc: Dr. William Yan, Director, Bureau of Nutritional Sciences;
Luc Bourbonnière, Section Head, Novel Foods Section.

December 22, 2016

RE: Request to examine possible safety implications of new finding that genetically engineered corn event NK603 is not substantially equivalent to its non-GE counterpart

Dear Ms. McIntyre,

We are writing to bring the recent study by Mesnage *et al.*¹ to the attention of Health Canada and ask that regulators carefully consider the results of this study in relation to the department's 2001 conclusion that Monsanto's genetically engineered (genetically modified or GM) herbicide tolerant "Roundup Ready" corn line NK603 is substantially equivalent to its non-GM counterpart, and related conclusions that Health Canada and the Canadian Food Inspection Agency made about the safety of NK603 for human consumption and animal feed.

In 2001, Health Canada approved NK603 with the conclusion that, "Health Canada is of the opinion that products from 603 corn are as safe and nutritious as those available from current commercial field corn varieties."² We ask Health Canada to revisit this conclusion in light of the new analysis now available.

The molecular profiling undertaken in the Mesnage *et al.* study shows that NK603 and its isogenic control are not substantially equivalent. Analyses of the proteomics and metabolomics revealed major differences between NK603 corn and its non-GM counterpart. A total of 117 proteins and 91 metabolites were found to be significantly altered by the genetic transformation process. Notably, the study found alterations in the levels of enzymes of glycolysis and TCA cycle pathways; changes in proteins and metabolites of glutathione and increases in the amounts of numerous polyamines. The study discusses that, "the nutritional quality of GM feed might be hampered by metabolic imbalances related to plant energy and stress metabolism."

This study is the first and most detailed “-omics” characterization of a commercialized GM crop. The use of such statistical and bioinformatics tools should now be integrated into Health Canada’s “novel food” safety evaluations, including with retroactive characterizations of approved products.

Health Canada maintains that “genetic modification does not introduce unique risks”³ and Canada’s regulation of “novel foods” is based on this foundational assertion. However we remain concerned that unintended effects with potentially significant consequences can occur due to the process of genetic engineering, as this study appears to show. The study concludes that, “the transformation process and the resulting expression of a transgenic protein cause a general disturbance in the GM plant and it is clear that NK603 maize is markedly different from its non-GM isogenic line at the proteome and metabolome levels.”

In 2012, Health Canada and the Canadian Food Inspection Agency, in response to the first long-term animal feeding study of NK603, stated that, “the overwhelming body of scientific evidence continues to support the safety of NK603.”⁴ We suggest that this may no longer be the case.

In 2012, Health Canada assured Canadians that “whenever new information concerning the safety of an authorized product arises, this new data is carefully reviewed. Should any risks of concern be identified from the consumption of NK603 or exposure to glyphosate, Health Canada and the CFIA will take appropriate action.”

Though the Canadian government does not track the use of GM traits, we know that NK603 is widely used. Our research shows that it has been incorporated into many GM corn hybrids currently marketed to farmers in Canada, including Genuity VT Double PRO (GENVT2P), Herculex 1 (HX1) with RR2- Liberty Link and RR, and YieldGard CB (YGCB) w/RR2.

In summary we ask Health Canada to examine the implications of this study and to:

1. Re-assess the 2001 decision to approve NK603 for human consumption and animal feed, with particular reference to the invalidity of the claim for substantial equivalence of NK603.
2. Consider how -omics characterizations should be incorporated into safety evaluations of genetically engineered “novel foods.”
3. Re-consider the presumption that genetic engineering does not introduce unique risks and begin a subsequent process of reforming Canadian regulation to address risks associated with the processes of genetic transformation.

Thank you for your response.

Sincerely,



Lucy Sharratt, Coordinator

¹ Mesnage R, Agapito-Tenfen S, Vilperte V, Renney G, Ward M, Séralini GE, Nodari N, Antoniou MN. 2016. An integrated multi-omics analysis of the NK603 Roundup-tolerant GM maize reveals metabolism disturbances caused by the transformation process. *Nature Scientific Reports* 6:37855. <http://www.nature.com/articles/srep37855> Accessed December 20, 2016.

² Health Canada. 2001. Roundup Ready® Corn Line 603. http://www.hc-sc.gc.ca/fn-an/gmf-agm/appro/roundup_ready_corn_603-mais_603_roundup_ready-eng.php Accessed December 20, 2016.

³ Health Canada. 2015. Frequently Asked Questions - Biotechnology and Genetically Modified Foods. Part 2: Safety Assessment of Genetically Modified Foods. "Do we know anything about the interactions between different genetically modified foods? For example, what are the risks to me from a salad made with corn and tomato products that were genetically altered?" http://www.hc-sc.gc.ca/fn-an/gmf-agm/fs-if/faq_1-eng.php Accessed December 20, 2016.

⁴ Health Canada and Canadian Food Inspection Agency statement on the Séralini et al. (2012) publication on a 2-year rodent feeding study with glyphosate formulations and GM maize NK603, October 25, 2012 <http://www.hc-sc.gc.ca/fn-an/gmf-agm/seralini-eng.php>