



251 Sir Frederick Banting Driveway  
Tunney's Pasture, A.L. 2202E  
Ottawa ON K1A 0K9

March 1, 2017

Lucy Sharratt  
Canadian Biotechnology Action Network (CBAN)  
Suite 206, 180 Metcalfe Street  
Ottawa, ON  
K2P 1P5

[coordinator@cban.ca](mailto:coordinator@cban.ca)

Dear Ms. Sharratt,

Thank you for your correspondence of December 22, 2016 concerning the recently published paper, "An integrated multi-omics analysis of the NK603 Roundup-tolerant GM maize reveals metabolism disturbances caused by the transformation process" by Mesnage et al., which compares the proteome and metabolome of a glyphosate tolerant corn (NK603) to those of its isogenic parent (DKC 2675).

Whenever new information arises that potentially relates to the safety of an authorized GM crop variety, this is carefully reviewed by Health Canada to determine whether risks are identified that would warrant taking appropriate action. Accordingly, scientists at Health Canada have conducted a review of the Mesnage (2016) study.

In this study, unmodified DKC 2675 and NK603 (sprayed or unsprayed with Roundup) corn varieties were grown, and the kernels were collected and analysed. The sample preparation and data collection, as described, appear to be in accordance with recognised procedures for proteomics and metabolomics studies. The data analysis involved mathematical handling that was conceptually rooted in established methodologies designed for the exploration of large biological datasets, but using sophisticated modifications. The authors report that this analysis identified 117 proteins and 91 metabolites where statistically significant differences existed between NK603 and the control corn DKC 2675.

It should be noted that the type of analytical methodology used in this paper is exploratory and is intended to generate hypotheses about biological functions based on measured differences in the estimated levels of proteins and metabolites. The application of this technology, however, still requires extensive validation and standardization before it may be relied upon for safety evaluations of novel foods. In addition scientists from Health Canada

.../2

have identified limitations in the study design and reporting. Specifically, the full sets of detected proteins and metabolites were not described or made available, only log fold changes (not absolute values) were reported for those identified as altered, and the natural variation of their levels were not determined through comparison to other corn varieties. This missing information provide key context with which to interpret the detected differences as they pertain to the assessment of potential hazards and exposure.

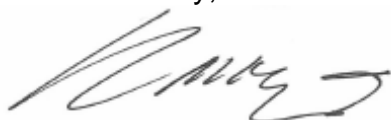
Mesnage and colleagues concluded that differences in protein and metabolite levels between DKC2678 and NK603 corn suggest that expression of the transgene is implicated in metabolic changes relating to the plant's energy usage and stress responses. They further state that the GM plant is not substantially equivalent to non-transgenic DKC2678 and that the nutritional quality may be impacted. To be clear, in the regulatory review process for GM foods, the concept of substantial equivalence serves only as a starting point for the safety assessment. Any differences between a new event and conventional comparator varieties require additional information to demonstrate that they do not present unique risks to consumers.

With this in mind, Health Canada evaluators have considered the previous safety assessment of NK603 corn in light of the information presented in this paper. It was found that none of the pathways or individual metabolites identified as statistically significantly altered by Mesnage and colleagues is clearly associated with toxin or allergen production, nor do they point to changes in nutrient level or composition. In short, the authors of this study did not demonstrate that the toxin, allergen, or nutrient profiles of the NK603 corn were altered in a way that would pose a risk to human health.

It is the opinion of Health Canada that the results reported in this paper do not raise any safety concerns with respect to corn event NK603. The scientific evidence continues to support the safety of NK603 genetically modified corn for use as food.

Thank you for writing.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Karen McIntyre', written in a cursive style.

Karen McIntyre  
Director General, Food Directorate