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Information Document and Request for Scientific Data:

Foodborne Pathogens in Dried Sprouted Seeds

March 2016

Bureau of Microbial Hazards
Food Directorate
Health Products and Food Branch

Canada

I. Context

Health Canada's Food Directorate has initiated the development of a risk profile on *Salmonella* in sprouted chia and flax seed powder. This work is being undertaken to identify the risk factors that may have an impact on the amplification of *Salmonella* during the production of dried sprouted seeds and powder, and to identify potential mitigation options specific to their production. To facilitate this work, Health Canada is issuing a call for data to inform the risk profile and to identify potential mitigation strategies that could be applied at various production stages.

II. Background

In 2014, sprouted chia powder was implicated as the cause of a *Salmonella* outbreak with 63 cases reported in Canada and 31 cases in the United States. In addition to this outbreak, a number of sprouted chia and flax seed powder products have been recalled over the past 2 years due to *Salmonella* contamination. These products are made from partially sprouted, dried and ground high oil containing seeds, and represent a previously unrecognized exposure vehicle for an existing pathogen. These products are considered to be shelf-stable low moisture foods that have ready-to-eat applications. Their shelf-life is approximately 2 years, and therefore, they may remain in consumers' homes for a long period of time. This may result in prolonged exposure to products which may be contaminated.

The general process for the manufacture of these products begins with the germination of the seeds via the addition of water, followed by a partial sprouting process (approximately 18-24 hours). Upon hydration, seeds such as chia, flax, arugula and cress become enveloped in a mucilaginous (gel-like), transparent polysaccharide that comes from the outer shell of the seed. Following the partial sprouting, sprouts are dried and then milled to a final product - sprouted seed powder. The sprouting process, conducted under high humidity and elevated temperatures, has the potential to enable the spread and growth of pathogens, if present on seeds.

Due to how sprouted dried seed products are produced, currently recommended interventions for raw sprouting seeds for human consumption cannot be applied. Unlike other sprouting seeds, the hygroscopic nature of chia, flax and other similar seeds does not allow for the use of aqueous antimicrobial wash treatments, such as calcium hypochlorite, chlorine, hydrogen peroxide or ozonated water. Current Canadian guidelines to address microbiological safety issues associated with the consumption of sprouted seeds include *Policy on Managing Health Risk Associated with the Consumption of Sprouted Seeds and Beans*, and *Code of Practice for the Hygienic Production of Sprouted Seeds*. However, these documents do not address the risks which are unique to mucilaginous seeds, and to the production of sprouted and dried seed powders.

III. Request for Scientific Data and Information

Health Canada is requesting scientific data because chia, flax and other seeds cannot be treated using water-based antimicrobial treatments due to their hygroscopic properties; and due to the limited published information regarding their treatment, processing, etc. Information of interest for this request includes, but is not limited to:

1. Microbiological data:
   - Enumeration of *Salmonella*, *E. coli* O157 and other foodborne pathogens on the contaminated sprouted seeds and final sprouted powder
   - Any relevant microbiological data on dried sprouted seeds that may be available

2. Processing-related data:
   - Information on the treatments applied during the processing of chia, flax and other mucilaginous seeds
     - What interventions are available to reduce/eliminate pathogens before sprouting?
     - What interventions are available to control the amplification and spread of pathogens during sprouting, sprout drying and milling?
     - What interventions are available to reduce the levels of pathogens in the final product (sprouted seed powder)?

   - Details on the production process (sprouting method, time, temperature, humidity and sprout drying process)

3. Food-related data:
   - Data on physico-chemical parameters of sprouted seed powder, i.e., water activity ($a_{w)}$, or other intrinsic factors of seeds that may have an impact on survival, growth and inactivation of *Salmonella*, *E. coli* O157 and other foodborne pathogens in the final product.

4. Preparation-related data:
   - Data relating to preparation practices and storage conditions (e.g., temperature) at food service establishments and consumer homes, i.e., recipes (ingredients including their proportions and method of preparation), and packaging or other extrinsic factors that may have an impact on survival and growth of pathogens in dried sprouted seeds and sprouted seed powder prior to the consumption.

IV. Information and Data

Information and data may be submitted in writing either by regular mail or electronically at the address indicated below. If you are submitting information or data electronically, please use the words **"Dried Sprouted Seeds Data and Information"** in the subject box of your e-mail.

This call for data will close at 11:59 pm EST on May 13, 2016.

Mailing address:

Health Canada, Bureau of Microbial Hazards
Evaluation Division
251 Sir Frederick Banting Driveway, Postal Locator: 2204E
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Confidential and/or unpublished information

Health Canada recognizes that some of the available information and/or relevant data that is being requested may be unpublished or of a confidential nature. If submitted, unpublished information would remain the property of the submitting organization or individual and its confidentiality will be safeguarded in so far as it is possible to do so within current regulations governing such issues. Specific issues relating to confidentiality should be discussed directly between the information owners and Health Canada. For these and other issues please contact the Food Directorate's Bureau of Microbial Hazards through the contact information provided above.