PPB Potato Glycoalkaloid Information Notice

Bauta Family Initiative for Canadian Seed Security - November 2020

Since 2013, farmers across Canada have been a part of the Participatory Plant Breeding Program for potatoes with the University of Manitoba, Agriculture and Agri-food Canada and the Bauta Family Initiative for Canadian Seed Security.

Farmers in the program are now exploring commercialization options for the material that they have been working with on their farms. This guide specifically addresses aspects of the most immediate option you have for your PPB potatoes: eating it and selling it as food. These options are the most straightforward options to choose that avoid regulatory challenges from your province and the Government of Canada.

There is a small but manageable public health risk to the production and consumption of potatoes. Potatoes produced from any variety possess small levels of glycoalkaloid toxins that can make consumers very ill if enough of it is consumed. In large enough doses and without medical attention, it can even be fatal. Even though the risk is small, the quantity of potatoes produced in Canada prompted the GoC to establish safe consumption standards and a system for monitoring the mainstream commercial value chain in potato production[1].

The PPB material you have been working with falls outside the mainstream potato system. Working with PPB material for personal and commercial potato production is very safe and legal. However, outside the conventional value chain in Canada infractions to potato glycoalkaloid standards are enforced on a complaint-basis without regular CFIA monitoring. Therefore those using the PPB material to produce potatoes for commercial use do not receive the assurance of CFIA monitoring for safety. This means that it is up to you to decide how you want to approach the risk of glycoalkaloid levels in the potatoes you consume and sell.

This guide covers what we think is helpful for you to consider with respect to potato glycoalkaloid content and the regulations surrounding it.

This is a quick glance of what you can take away from this notice:

- Health Canada prohibits the sale of unsafe food and the *Food and Drugs Regulations* say that you are not permitted to sell potatoes that contain 200+ p.p.m of tuber glycoalkaloids (TGA). The penalties for contravention are determined by a judge if charged for violating the Regulations.

[1] See CFIA advisory on TGA in potatoes.
https://www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/food-safety/glycoalkaloids-foods.html

- TGA presence in potatoes is monitored and enforced on the basis of public complaints and random testing. New potato varieties also undergo TGA testing if they go through the variety registration process.
- There is only one pay-for-service lab in Canada that is accredited to perform this testing by the CFIA. However, TGA toxicity is not a potato-borne disease so testing done by a professional lab using a recognized method can be accepted as proof of regulatory compliance.

Regulatory considerations that cover selling your potato as seed will not be covered in this guide. We will be sharing a more comprehensive guide covering the opportunities and challenges we feel is important to consider when deciding what to do with your PPB material. This guide will be available in the winter of 2021.

Canadian Regulations Surrounding TGA Content of Potatoes:

Health Canada's Food and Drugs Regulations say that a potato tuber is "*adulterated*" if it contains more than 200 p.p.m of either or a combination of alpha-solanine and alpha-chaconine glycoalkaloids (20 mg total glycoalkaloids per 100 g (fresh weight) of potato tuber)[2].

The Food and Drugs Act prohibits selling any food that contains a poisonous or harmful substance, is not fit for human consumption, or *is adulterated*. It is a violation of this prohibition if one sells potatoes to customers that have a higher concentration of alpha-solanine and alpha-chaconine glycoalkaloids than is permitted according to Health Canada's List of contaminants and other adulterating substances in foods.

Infractions are typically monitored through the testing of samples of commercially-distributed potatoes (graded potatoes). They are also addressed on a complaint-basis from consumers. The CFIA has the authority from the Government of Canada to inspect, sample, seize, or request documentation of the potatoes if they have reasonable grounds to suspect that it could be in non-compliance to the *Food and Drugs Act*[3].

If the potatoes are determined to be in non-compliance to the *Food and Drugs Act* then AAFC has the authority to dispose of the offending potatoes at the expense of the owner. Violations of the Food and Drugs Act may also be subject to legal punishments as determined by a court or judge. However, the *Food and Drugs Act* also allows for preventative and remedial approaches to violations.

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[2] See Health Canada's List of contaminants and other adulterating substances in foods: https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/contaminants-adulterating-substances-foods.html

[3] See Health Canada's Glycoalkaloids in Foods Notice https://www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/food-safety/glycoalkaloids-foods.html

What you need to do to comply with the Food and Drugs Regulations:

If you received your original potato materials in 2013, some of the selections made from these materials were tested in 2017 and their TGA levels were found to be safe. You can look up the testing data for your selections in this report. However, we cannot guarantee that what you harvest from your PPB material contains the same levels of TGA as what was tested in the laboratory.

If you received your potato materials in 2016, 2017, or 2018, no tests for TGA levels have been conducted on your materials.

There are two unofficial indicators for the presence of elevated levels of TGA in potatoes. The first indication is greening and sunburn on the potato flesh. However, greening can also be the product of certain growing conditions or too much post-harvest light exposure. The second indicator is bitter taste in the potato. These two indicators, however, are not a sufficient substitute for testing using a recognized method. Health Canada does not accept informal ways of checking for TGA as proof of regulatory compliance[4].

You can test the PPB potato material to make sure that it is safe to consume through a lab. The CFIA lists two specific methodologies to test of TGA for the purposes of potato variety registration[5]:

- High Performance Liquid Chromatography
- Colourimetric analysis

Health Canada accepts TGA test results that were produced by any credible testing laboratory, provided they use one of the prescribed methodologies. The CFIA has accredited one laboratory to conduct these tests on a fee-for-service basis. **The TGA test costs $312 per potato tissue sample**[6]. Samples can be sent directly to the Silliker lab in BC, or to a partner lab in Markham, Ontario. You can reach out to Silliker JR Laboratories for a quote for this testing:

Silliker JR Laboratories ULC (Mérieux NutriSciences)
8255 North Fraser Way, Unit 106
Burnaby, British Columbia
Email: Catrin.Hall@mxns.com

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[4] See Health Canada's Glycoalkaloids in Foods Notice https://www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/food-safety/glycoalkaloids-foods.html

[5] More details on accepted testing methodologies for TGA in seed potatoes are available on the CFIA guide for variety registration. https://www.inspection.gc.ca/plant-varieties/variety-registration/registration-procedures/guidance-document/eng/1411564219182/1411564268800?chap=0#s24c3

[6] This price does not include HST. The price was quoted by Silliker JR Laboratories ULC on November 16, 2020.

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For more information please consult the following guides from the CFIA

- CFIA notice on TGA toxicity in potatoes (LINK)
- TGA testing requirements for seed potato variety registration (LINK)
- Silliker JR Laboratories ULC (Mérieux NutriSciences) contact page (LINK)