N and P Industry Questionnaire

Canadian Food Inspection Agency (CFIA)
Fertilizer Safety Section

Background:

In addition to safe guarding human, plant and animal health, environmental protection is a cornerstone of the CFIA mandate. Therefore, it is important that nutrient guarantees on fertilizer labels are accurate. Significant exceedances (higher nutrient content than what is represented on the label) may lead to unintentional over-application and ensuing nutrient losses to the environment. This undermines the Agency's environmental protection mandate and jeopardizes the Government of Canada's climate change mitigation efforts. It also short-circuits on-farm nutrient management plans and contradicts the principles of the industry's 4R nutrient sustainability framework.

Modernization of the *Fertilizers Regulations:*

Nutrient guarantees required by the *Fertilizers Regulations* continue to be expressed on minimum basis (as opposed to actual nutrient content). This is predicated on the assumption that any significant nutrient over-formulation is effectively monitored and regulated. Any regulatory or non-regulatory control measures such as upper tolerance for nutrient guarantees must be commensurate with the level of environmental risk, realistic, implementable and reflective of marketplace realities. As such, they must be based on **current** industry data which is not readily available to the CFIA**.** To address this gap, the CFIA is requesting that members of the fertilizer sector (manufacturers, sellers, importers or distributors of both chemical fertilizers as well as organically derived waste materials) fill out the **attached questionnaire** (Appendix A). The goal of the information gathered is to ascertain:

- Whether over-formulation occurs in fertilizers imported or sold in Canada?
- If so, what is the frequency, preponderance and magnitude of guarantee exceedance?
- Is nutrient content variability similar or different between sectors (e.g. synthetic or mined fertilizers vs. organic-based products)?

Recent Biosolid survey:

The CFIA conducted a survey (April 29- June 30, 2021) of beneficial uses of waste-derived materials in Canada. Regrettably, the response rate was very low (a total of 18 responses were received from some but not all provinces and territories). The findings and the summary report are attached (Appendix B). It is important that the input data used in the environment impact assessment and ensuing development of any control measures, such as upper tolerances for Nitrogen[N] and Phosphorous [P] guarantees, be representative of the whole country and the entire waste stream collection and recycling sector.

Objective of the questionnaire:

The questionnaire is intended to gather a comprehensive and robust data package that will inform the environmental impact assessment to be conducted by the CFIA. The information request extends beyond the preliminary scope of the biosolid survey and it is important the generators and sellers or waste derived materials applied to soils as fertilizers and supplements across Canada be adequately represented.

Note: All information provided to the Agency in support of this initiative will be treated as Confidential Business Information and protected under the *Access to Information Act* and *Privacy Act.*

Please submit **one questionnaire per product type** by February 11th, 2022 to:

Doug Sasaki
Fertilizer Safety Section,
Plant Production Division, CFIA
douglas.sasaki@inspection.gc.ca

Thank you for your time and input!

APPENDIX B

Summary Report
Canadian Food Inspection Agency (CFIA)
Survey of beneficial uses of waste-derived materials in Canada as fertilizers or supplement
(April 29- June 30, 2021)

Background

Land application of organically derived fertilizers such as compost, manure, biosolids, and anaerobic digestates are strongly promoted by provincial and municipal authorities as means of waste diversion. Organically derived products such as municipal biosolids and composts that are imported or sold in Canada as fertilizers or supplements are regulated by the Canadian Food Inspection Agency (CFIA) under the federal *Fertilizers Act*. As most of these products are exempt from mandatory registration, the CFIA's information about the sector is limited. The CFIA conducted this survey to better understand the relative nutrient content of the products generated (as evidenced by Nitrogen [N] and Phosphorous [P] analysis) and their land application practices used across Canada.

The data collected from this questionnaire provides information about nutrient content variability above what's guaranteed on the label. It also collects information on facility types, feedstock, processing and volume of biosolids generated and applied to land.

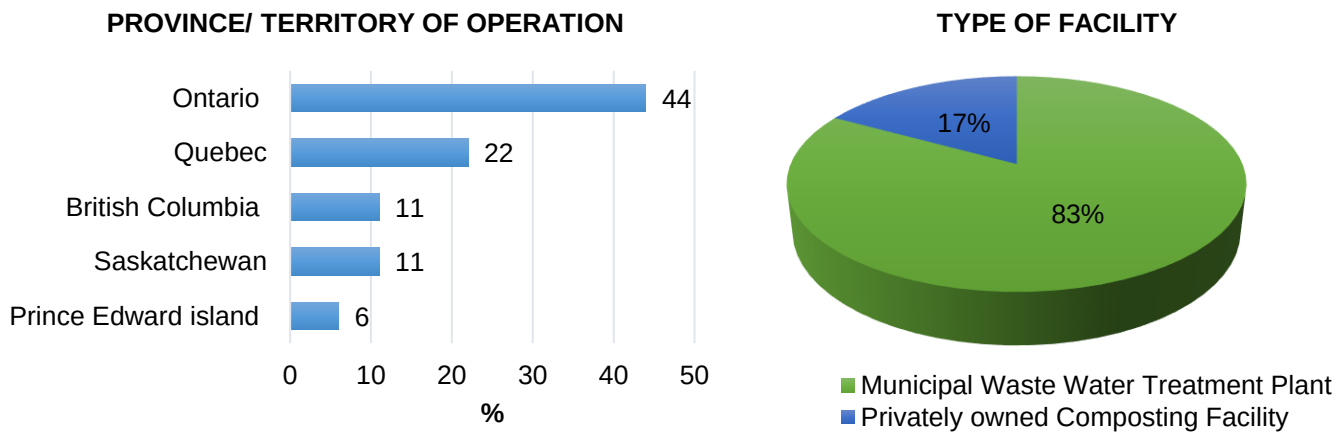
NOTE: The information obtained through this questionnaire is based on a relatively small number of responses received by the CFIA (total of 18), from some but not all provinces and territories. Hence, it should be recognized that the data may not be representative of the whole country or the sector.

Results

A. Response Rate, Location Data and Facility Type

In total, the CFIA received 18 responses to the questionnaire. Majority of the responses were received from Ontario (44%) and Quebec (22%). Vast majority of responses (83%) were submitted by municipal waste water treatment plants with rest being privately owned composting facilities.

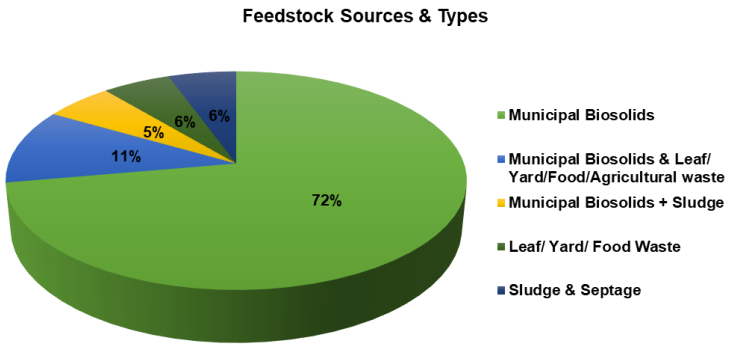
Figure 1: Summary of Facility Type and Location



B. Feedstock Sources and Types

The CFIA collected data on feedstocks derived from both food waste and non-food waste (including leaf and yard waste, municipal biosolids, sludge and septage). Municipal biosolids alone (72%) are the top most processed feedstocks among all the facilities. There are some facilities that use municipal biosolids in combination with sludge, septage, leaf and yard waste, food waste and agricultural waste.

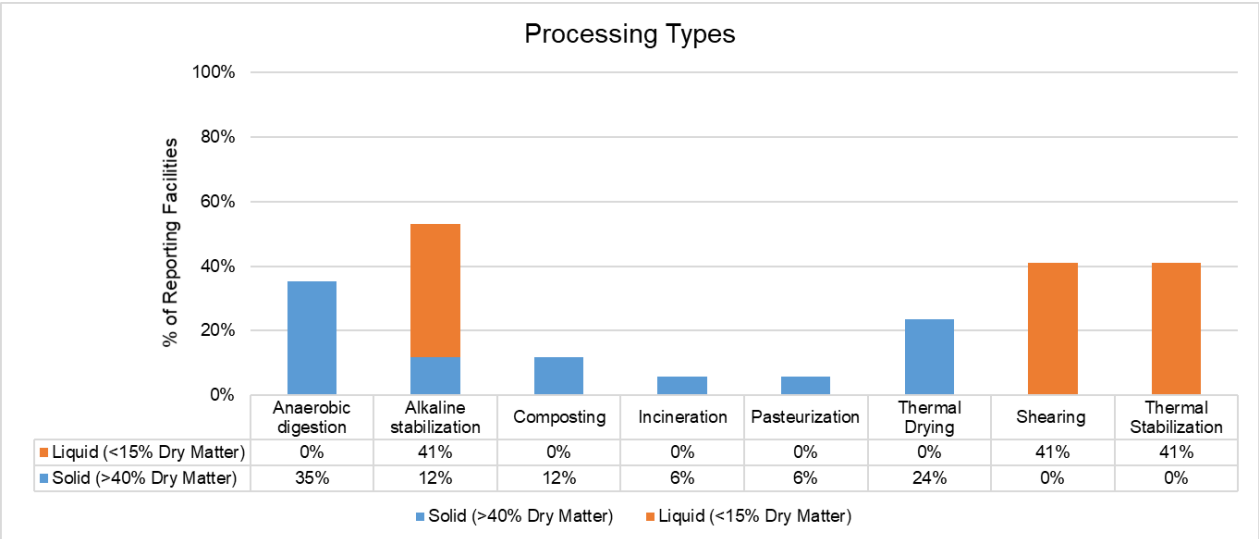
Figure 2: Summary of Feedstock Sources and Types



C. Processing Method and Product Type

The CFIA asked operators to identify what types of processing is performed on the feedstocks at their facility. A single facility can use various different processing treatment methods to arrive at the final product. Alkaline stabilization combined with shearing and thermal stabilization are the top most utilized processing types methodologies (41%). In addition, vast majority of facilities generate product in liquid form (solid content ranges between 3-15%), while the rest generate solids, either in a cake or in pellet form (solid content >40%).

Figure 3: Summary of Processing and Product Type



	Anaerobic digestion	Alkaline stabilization	Composting	Incineration	Pasteurization	Thermal Drying	Shearing	Thermal Stabilization
Liquid (<15% Dry Matter)	0%	41%	0%	0%	0%	0%	41%	41%
Solid (>40% Dry Matter)	35%	12%	12%	6%	6%	24%	0%	0%

D. Volume, Rate of Application and Timing

Majority of facilities (78%) generate 1-50,000 metric tonnes of biosolids annually. Almost half of the facilities reported an application rate of 5-10 tonnes/ hectare and majority recommend applying biosolids once every 1-2 years, mainly in the spring, fall and after harvest . It should be noted that some facilities recommend to perform soil sampling to determine the appropriate application rate. The table below summarize the results collected from the questionnaire for biosolid application practices.

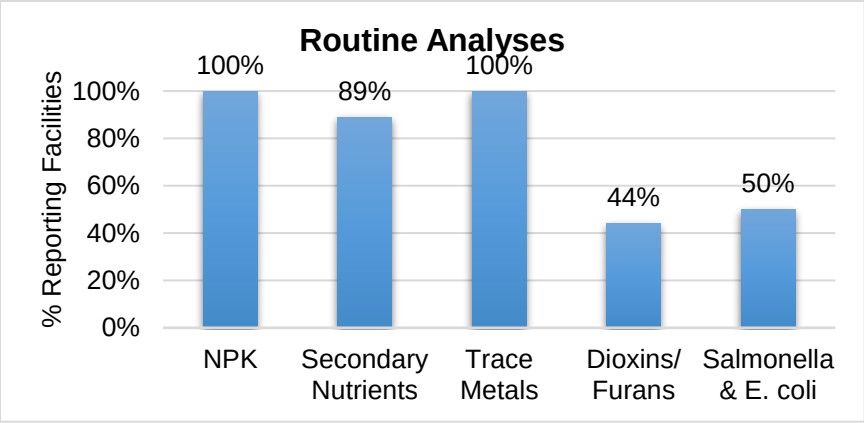
Table 1: Summary of Typical Characteristics of Biosolids Application Practices

Characteristics	Application at Agricultural Land	Application at Reclamation Sites	Application at Rangeland
Application Rates	Varies; majority range in dry weight of 5-10 tonnes per hectare	Not Provided	Approximately dry weight of 15-20 tonnes per hectare
Application Frequency	Varies; from annually to once every 1-2 years	Not Provided	Approximately 1 time every 4 or 5 years
Application Timings	Varies; spring, fall and after harvest	October to February	Spring through fall

E. Routine Analysis

All facilities conduct routine analysis for nutrient content (Nitrogen [N], Phosphorous [P] and Potassium [K]). Majority of the facilities also test for *Salmonella* and *E. coli* and vast majority (83%) use privately owned laboratories for analyses.

Figure 4: Summary of Routine Analyses

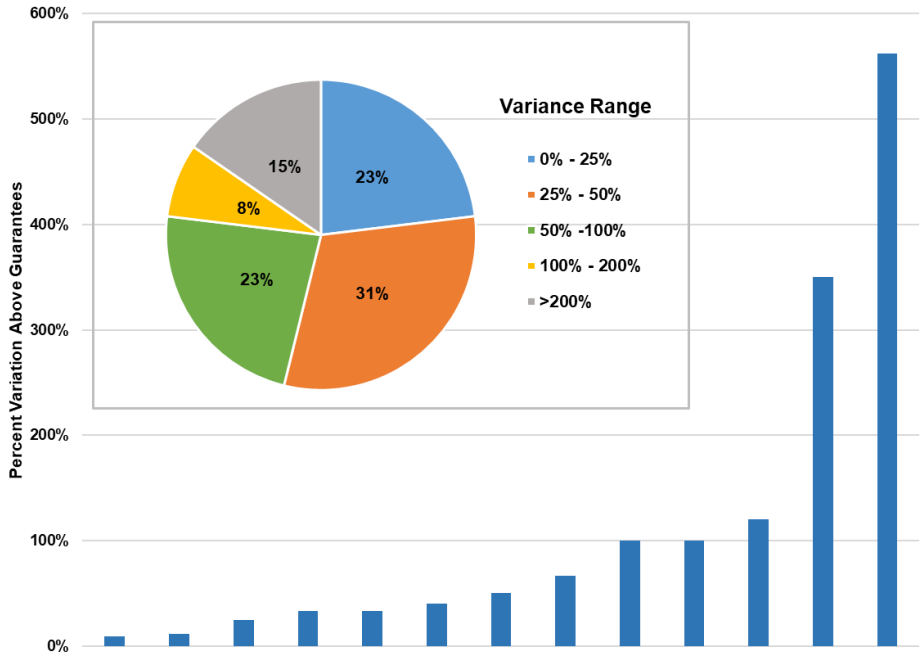


F. Nutrient Content Variability

Nitrogen [N]

With data pooled from all responses, considerable variability in nutrient content is observed from facility to facility. The **typical guarantees** for Nitrogen range from 1-4%, whereas the actual **nutrient content** range of 3-9%. For majority of the facilities (31%), the exceedance of guarantees is reported between 25-50%.

Figure 5: Nitrogen Variance Above Guarantee

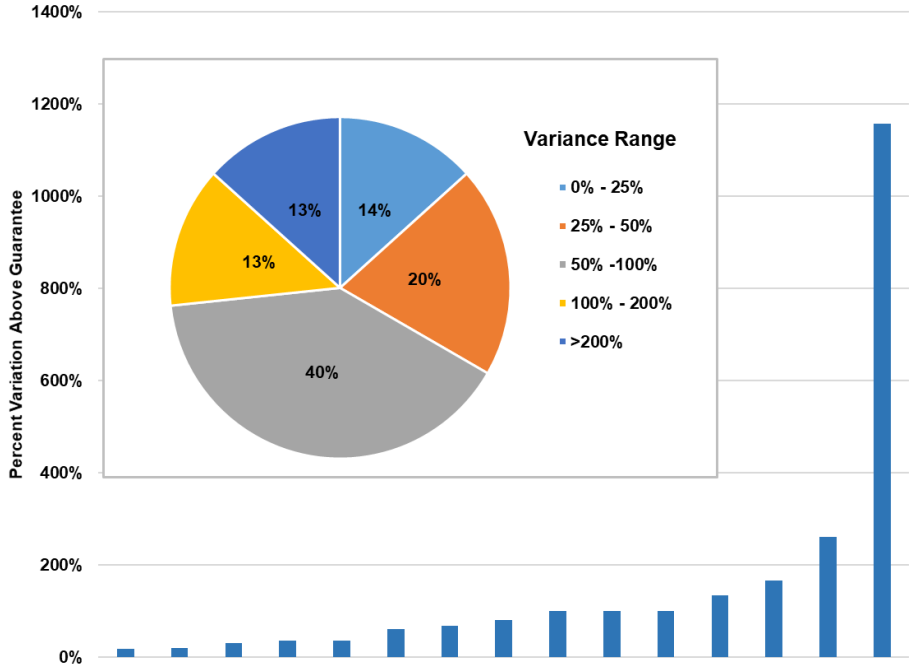


Note: Each bar represent a single facility that provided the responses

Phosphorous [P]

Similarly for Phosphorous, the typical guarantees range from <1-6%, whereas typical nutrient content ranges from <1-9% (Figure 5). The most common exceedance of 50-100% is reported by majority of the facilities (40%).

Figure 6: Phosphorous Variance Above Guarantee



Note: Each bar represent a single facility that provided the responses

G. Conclusion

Organically derived fertilizers such as compost, manure, biosolids, and anaerobic digestates are highly heterogeneous in nature. Consequently, their nutrient content can vary considerably, which unless managed properly, can result in potential over-loading of nutrients to the soil.

The information obtained from this questionnaire corroborates these trends, however it has to be kept in mind that considering relatively small number of responses received by the CFIA (total of 18), the conclusions drawn here are preliminary. The reported level of variability in nutrient content may not be representative of the entire sector or all provinces and territories across Canada. The challenge of drawing conclusions is further compounded by the differences in processing type or moisture content of the final product. Even though the data collected may not be representative of the whole country, it provides valuable information about volume of biosolids applied to land and their nutrient analysis conducted by industry.

The information collected from this questionnaire will serve as an important first step in conducting environmental impact assessment of over-formulation of Nitrogen [N] and Phosphorous [P] in commercial fertilizers in Canada. The end goal being establishing risk mitigation options (in close collaboration with industry partners) that are commensurate with the risk, feasible, realistic and cost effective for industry to adopt while respecting the Agency's environmental protection mandate and Government of Canada climate change agenda.