MANDATORY CANNABIS TESTING FOR PESTICIDE ACTIVE INGREDIENTS

Requirements

Government of Canada Gouvernement du Canada

Canada

Health Canada is the federal department responsible for helping the people of Canada maintain and improve their health. Health Canada is committed to improving the lives of all of Canada's people and to making this country's population among the healthiest in the world as measured by longevity, lifestyle and effective use of the public health care system.

Disclaimer: This document must be used in conjunction with the Mandatory cannabis testing for pesticide active ingredients—List and limits, which lists pesticide active ingredients subject to the mandatory testing and their limits of quantification.

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Contents

1.0 Purpose

This document outlines the requirements for mandatory testing for pesticide active ingredients in cannabis products. The objective of the mandatory testing is to assist holders of licences for cultivation or for processing to ensure that:

- The requirements of the *Pest Control Products Act* and the *Cannabis Act* related to the use of pest control products (PCPs) are met
- Individuals have access to quality-controlled cannabis products that have not been treated or contaminated with unauthorized PCPs
- Individuals have accessible and accurate information to make informed decisions

To meet the testing requirements, licence holders under the *Cannabis Regulations* must demonstrate that none of the unauthorized pesticide active ingredients, as listed in the Mandatory cannabis testing for pesticide active ingredients—List and limits published by Health Canada, are used to treat their products or have contaminated their products.

This document outlines the regulatory requirements under the *Cannabis Regulations* and additional requirements related to pesticide testing, reporting and record keeping. It explains what the focus of inspections related to the mandatory cannabis testing will be, where information will be disclosed, when this document will be updated, and includes a list of questions and answers related to the implementation of this document. In addition, it includes best practices related to pest management and the use of PCPs in Appendix A.

Health Canada's Cannabis Legalization and Regulation Branch is the authority responsible for licensing and compliance monitoring under the *Cannabis Act* and its Regulations. The Cannabis Directorate of Health Canada's Regulatory Operations and Regions Branch delivers on a compliance and enforcement mandate that supports the Cannabis Legalization and Regulation Branch and conducts inspections and compliance verifications to enforce the *Cannabis Act*.

Health Canada's Pest Management Regulatory Agency is the authority responsible for regulating PCPs under the *Pest Control Products Act* and associated regulations. Promoting, monitoring and enforcing compliance under the *Pest Control Products Act* is a shared responsibility between the Pest Management Regulatory Agency and the pesticide compliance program of the Regulatory Operations and Regions Branch.

Health Canada will use this document to assess licence holders' compliance with the requirements of the *Cannabis Act* and the *Cannabis Regulations*. It should be read in conjunction with the requirements set out in the *Cannabis Act* and the *Cannabis Regulations* and as shown on individual licences.

2.0 Background

In February 2017, following three recalls of cannabis for medical purposes related to the unauthorized use of PCPs, Health Canada announced that it would begin a series of unannounced inspections and targeted testing of cannabis products from licensed producers under the *Access to Cannabis for Medical Purposes Regulations* to ensure that only authorized PCPs were used during the production of cannabis. Test results from samples collected during these inspections demonstrated that some licensed producers were using unauthorized PCPs. Health Canada recognized the need to introduce additional measures to strengthen its monitoring of the use of PCPs and reduce the potential public health risk.

In May 2017, Health Canada announced it would require mandatory testing for the presence of pesticide active ingredients in all cannabis products, before the products could be sold or provided to individuals. Terms and conditions were added to the licences of all licence holders where the use of unauthorized PCPs had been detected, requiring these licence holders to undertake mandatory testing for unauthorized PCPs on all of their cannabis products and to report the test results to Health Canada before the products could be sold or provided to individuals.

Health Canada also announced it would continue to carry out targeted testing of product samples collected during its regular and unannounced inspections of licence holders.

Health Canada undertook the development of the mandatory testing requirements and consulted with regulated parties and stakeholders in summer 2017 and winter 2018. In April 2018, the peer-reviewed methodology for analyzing pesticide active ingredients in cannabis developed by the Pest Management Regulatory Agency was distributed to laboratories to support their preparation for implementation of the mandatory testing requirements.

Mandatory testing for the presence of pesticide active ingredients is in addition to the existing requirements under the *Cannabis Act* that require tests for microbial and chemical contaminants; disintegration of capsules; solvent residues; and quantity or percentage of delta-9-tetrahydrocannabinol, delta-9-tetrahydrocannabinolic acid, cannabidiol and cannabidiolic acid.

3.0 Scope

This document is intended for use by licence holders authorized under the *Cannabis Regulations* to produce cannabis and for the holders of a licence for analytical testing that will be conducting the mandatory tests. Licence holders are responsible for ensuring mandatory testing for pesticide active ingredients is completed before a cannabis product is sold.

4.0 Regulatory requirements

The *Cannabis Regulations* outline regulatory requirements that licence holders are required to follow when conducting activities with cannabis.

4.1 Good production practices

Part 5, sections 79 to 88, of the *Cannabis Regulations* lists the good production practices (GPP) related to cannabis.

Under section 79, the holder of a licence must not sell, distribute or export cannabis unless the GPP have been met.

Section 81 prohibits treating cannabis with PCPs unless the PCP is registered or otherwise authorized for that use under the *Pest Control Products Act*. The Pest Management Regulatory Agency's online pesticide label search tool can be used to determine which PCPs are registered and authorized for use on cannabis and industrial hemp. All other PCPs are prohibited from being used on cannabis or industrial hemp.

Sections 84 and 86 require licence holders to maintain their building and equipment in a manner that permits activities to be conducted under sanitary conditions, and that prevents the contamination of substances handled in these activities.

Under section 87, licence holders must have a sanitation program to effectively clean the building and equipment used in those activities.

4.2 Licence conditions

The following condition is being added to each licence for cultivation or for processing:

[NAME OF HOLDER] must meet the requirements of the *Mandatory cannabis testing for pesticide active ingredients*./[NOM DU TITULAIRE] doit respecter les exigences relatives à l'*Analyse obligatoire du cannabis pour les résidus de principes actifs de pesticides*.

This condition is effective as of the effective date of this document.

4.3 Sampling requirements

Section 92 of the *Cannabis Regulations* requires licence holders to take a representative sample of a lot or batch of cannabis product for laboratory testing.

For the purpose of these requirements, a sample may also qualify as representative if it is taken before the packaging and labelling of that lot or batch of cannabis product. For seeds and cuttings, a sample of the plants from which they were taken may qualify as representative.

Under section 92, licence holders must also ensure that a portion of the sample is retained in sufficient quantity to enable the determination of whether the lot or batch meets the requirements of section 81, which specify that cannabis must not be treated with a PCP unless the PCP is registered for use on cannabis under the *Pest Control Products Act* or is otherwise authorized for use under that Act.

In addition, under section 80, cannabis must be sampled in accordance with a standard operating procedure that is designed to ensure that, among other things, a representative sample is produced. Licence holders must prepare and approve sampling procedures specific to each type of product to be tested. The sampling procedures may be verified during inspections.

4.4 Record keeping

As per section 231 of the *Cannabis Regulations*, licence holders (other than cannabis drug licence holders) must maintain records demonstrating their adherence to the GPP. Licence holders must be able to demonstrate, using records available at the licensed site, that the activities conducted are compliant.

5.0 Testing, reporting, and record keeping requirements

5.1 General requirements

All cannabis products must be tested for pesticide active ingredients before they are sold or distributed to the holder of a licence for sale (e.g., for medical purposes), or to a person authorized to sell under a provincial or territorial Act as provided under section 69(1) of the *Cannabis Act*.

This includes fresh or dried cannabis, cannabis plants and seeds, and cannabis oil, and applies to cannabis produced indoors and outdoors, and any cannabis products derived from industrial hemp. In addition, all cannabis products intended for export must be tested.

This testing must be completed by the holder of a licence for cultivation that is authorized to sell cannabis plants and seeds, or the holder of a licence for processing that sells any cannabis products (i.e., fresh and dried cannabis, cannabis plants and seeds, and cannabis oil).

This testing is mandatory and is in addition to the other analytical testing under Part 5 (Good Production Practices) of the *Cannabis Regulations* that must be completed before each lot or batch is approved and made available for sale.

5.2 Testing requirements

A representative sample of each lot or batch of cannabis product, as per section 4.3 of this document, must be taken in accordance with the approved sampling procedure and tested for pesticide active ingredients.

Health Canada has set a limit of quantification (LoQ) for pesticide active ingredients in each matrix (i.e., fresh cannabis and cannabis plants, dried cannabis, and cannabis oil). These limits are based on the identification and quantification of the molecule using current chemical analytical methods and equipment.

The pesticide active ingredients and their LoQ are listed in the Mandatory cannabis testing for pesticide active ingredients—List and limits published by Health Canada. Health Canada reviews this list periodically and amends it if necessary.

Holders of a licence for cultivation or for processing must ensure that the mandatory testing is done for all pesticide active ingredients that have a LoQ identified in the list. Each lot or batch of cannabis products must be stored and not made available for sale before receipt of the test results. More details are provided in section 5.3 of this document with regard to what must be done following the testing.

5.2.1 Laboratory testing

The mandatory testing must be performed by a third-party laboratory that holds a licence for analytical testing ("the laboratory") under the *Cannabis Regulations*. The laboratory must be a distinct entity that functions and reports independently of the licence holder requesting the analysis.

The independence of the laboratory from any other licence holder is fundamental. Although the licence holder and the laboratory may share a common goal of assuring that high-quality cannabis is produced, their interests may sometimes conflict as the laboratory reports may affect the licence holder's output.

Similar to the requirements that apply to licensed drug manufacturing establishments subject to good manufacturing practices, the laboratory must have access to adequate and separate facilities, equipment and trained personnel to fulfill its duties and responsibilities.

For quality assurance purposes, licence holders requesting the analysis are responsible for:

- Ensuring the laboratory is licensed under the *Cannabis Regulations* to possess and conduct analytical testing of cannabis
- Assessing the suitability of the laboratory to conduct pesticide detection analysis and maintain records of the assessment
- Ensuring the laboratory uses validated methods for these tests
- Providing the laboratory with the most recent version of Health Canada's Mandatory cannabis testing for pesticide active ingredients—List and limits before the tests

Licence holders are required to maintain records, in the form of a certificate of analysis, of the analyses conducted by the laboratory for each lot or batch of cannabis products. The certificate must contain the following:

- Information about the licence holder (name, address, person requesting the test)
- Information about the laboratory (name, address, contact information)
- Information about the testing method (name of the method, equipment used, date of last validation)
- Information about the cannabis product (lot or batch number, product type)
- Date the product sample was taken by the licence holder
- Date the product was tested by the laboratory
- List of the pesticide active ingredients for which the product was tested
- The laboratory's LoQ showing that it is equal to or lower than Health Canada's for each pesticide active ingredient
- The result of the analysis for each pesticide active ingredient in the product
- An attestation of the test results by the laboratory (signature of the head or alternate head of laboratory, date the certificate is issued)

5.2.2 Method validation

The laboratory must ensure its methods are validated before using them. The methods must be able to quantify pesticide active ingredients against the background of the naturally occurring chemicals in the samples.

The LoQ of the validated method must be equal to or lower than the LoQ set in the Mandatory cannabis testing for pesticide active ingredients—List and limits published by Health Canada. The laboratory must produce and maintain records documenting the results of validation studies. These may be verified during inspections.

The laboratory's analysis methods must be specific to fresh cannabis and cannabis plants, dried cannabis, and cannabis oil. These methods should require the sample extract to be cleaned using common pesticide extraction techniques (e.g., a QuEChERS technique alone or in combination with solid-phase extraction). The extract may then be concentrated or analyzed directly on

chromatographic and spectroscopic instruments (e.g., by gas chromatography tandem mass spectrometry [GC-MS/MS] or liquid chromatography tandem mass spectrometry [LC-MS/MS]).

Guidance on validating methods can be obtained in publications such as the Q2B: Validation of Analytical Procedures: Methodology published by Health Canada or any standard listed in Schedule B of the *Food and Drugs Act*. For reference, the Pest Management Regulatory Agency's laboratory has published its method for the analysis of pesticide active ingredients in cannabis in the scientific *Journal of AOAC International* (Moulins JR, Blais M, Montsion K, et al., *J AOAC Int*. Published online: May 29, 2018. doi: 10.5740/jaoacint.17-0495).

5.3 Reporting requirements

Licence holders that requested the analysis must report any test result that equals or exceeds the LoQ set by Health Canada in the Mandatory cannabis testing for pesticide active ingredients—List and limits, or the LoQ set by the laboratory if it is lower than that set by Health Canada. Unless otherwise stated, all reports, including the certificate of analysis for the affected lots or batches, must be sent by email to cannabis@canada.ca as soon as possible, but no later than seven calendar days after receipt of the results.

5.3.1 Test results of products after sale

Mandatory testing is meant to reduce the need for product recalls related to the unauthorized use of PCPs on cannabis. Nevertheless, in the event that a product treated or contaminated with any unauthorized PCP has been sold or provided, the licence holder must immediately stop the sale of the product and immediately report the test results to Health Canada along with the information listed in section 247 of the *Cannabis Regulations* (Voluntary Recall) before commencing a recall of the product.

Health Canada publishes all product recalls on its Recalls and safety alerts website.

5.3.2 Product quarantine and root cause analysis

After the receipt of any positive test result, licence holders must ensure that the affected lot or batch of cannabis product is properly quarantined to avoid cross-contamination. They must also immediately begin a root cause analysis to identify the source of contamination, and prepare and implement a corrective and preventative action plan to prevent, as applicable, a reoccurrence. The licence holder must report their root cause analysis and action plan to Health Canada for review and await further instructions. Health Canada may require the licence holder to take additional actions that it deems necessary to protect the health and safety of Canadians. Health Canada may also take compliance and enforcement action(s) if warranted.

If the root cause analysis determines that cannabis was not produced in compliance with the GPP, that lot or batch cannot be made available for sale.

5.4 Record keeping requirements

Licence holders, including holders of a licence for analytical testing but not holders of a cannabis drug licence, are required to maintain all records relevant to the mandatory testing requirements at the licensed site for a period of two years after the day on which the information is recorded. This includes results that were reported to Health Canada and those that were not, as well as those related to destroyed lots or batches of cannabis products. These records must be made available for review in a timely manner during inspections.

These record keeping requirements are in addition to those in section 231 of the *Cannabis Regulations*.

6.0 Focus of inspections

Inspections conducted at licence holder sites to ensure that the requirements of the mandatory testing for pesticide active ingredients are met may include the verification of information and activities. For example, inspectors may ask to review:

- The certificate of analysis for all tests conducted
- Any root cause analysis and corrective and preventative action plans
- The standard operating procedures related to the GPP, sampling, analytical testing, and PCPs (e.g., an integrated pest management program, list of all PCPs used on cannabis)
- Product release criteria that include PCP testing
- Batch records including records related to spray logs, sanitation records, fertigation program (fertilizers + irrigation), rooting gels, and anything used on cannabis plants from seed or propagate to point of sale

Inspectors may collect samples (e.g., plants, dried cannabis, or cannabis oil) from the licence holder's site for testing at Health Canada's laboratory. In addition to cannabis products, samples collected may include inputs used at the site, such as soil, fertilizer, carrier oils or PCPs.

Inspectors may also assess the compliance of licence holders with the relevant GPPs. For example, sections 84, 86 and 87 of the *Cannabis Regulations* set out additional requirements that licence holders must follow.

Under the GPP, licence holders are expected to assess possible sources of contamination and adopt precautionary measures to prevent the adulteration of the cannabis they produce. Sources of contaminants may include:

- Substances used in cultivation of cannabis, including in cultivation of industrial hemp

- Products to control structural pests and other products used as part of a sanitation program
- Fields adjacent to production facilities, which may cause agricultural residues to enter through ventilation intakes, or surface and well waters
- Refurbished facilities and equipment that may have residues from past operations

To help assess these sources, licence holders may consider:

- Testing for other pesticide active ingredients that are not listed in the Mandatory cannabis testing for pesticide active ingredients—List and limits
- Taking and retaining samples of material sold or distributed to other licence holders
- Taking samples and analyzing substances that are used throughout their production process, as well as intermediates that are used to create final products (e.g., water, carrier oils or packaging containers)

Health Canada has the authority to take compliance and enforcement action if an unauthorized PCP is used by a licence holder, whether or not that product is listed in the Mandatory cannabis testing for pesticide active ingredients—List and limits and regardless of the level of contamination.

Finally, Health Canada provides an inspection report to the licence holder.

7.0 Disclosure and publication of test results

Health Canada shares the test results of samples taken during inspections with the relevant licence holder. Health Canada also publishes information on all test results of samples taken during inspections on a quarterly basis as part of the Quarterly Compliance and Enforcement Report, Inspection Data Summary.

Licence holders may wish to consider publishing the test results for all of their products, to promote transparency and openness.

8.0 Updates to this document

Health Canada will update this document as needed and inform all regulated parties and stakeholders of changes in advance with a sufficient amount of time to allow them to prepare for any new or updated requirements.

9.0 FAQs

1. What is the purpose of the requirements for mandatory cannabis testing for pesticide active ingredients?

This document sets out the obligations of licence holders under the *Cannabis Act* with regard to testing cannabis products for the presence of pesticide active ingredients. These requirements are in addition to other analytical testing to help ensure that cannabis products meet the regulatory requirements set out to protect the health and safety of Canadians.

In addition, Health Canada provides a list of best practices related to pest management and the use of pest control products (PCPs) where cannabis is produced. These best practices are included in Appendix A of this document.

2. When will the requirement for mandatory testing for pesticide active ingredients come into effect?

The mandatory testing requirements come into effect on January 2, 2019. This provides a period of time for all licence holders to prepare to test for the indicated pesticide active ingredients. At that time, licence holders will need to meet the testing requirements, as indicated on their licence, in addition to the requirements of the *Cannabis Act*.

3. Will licence holders be required to test cannabis products retroactively?

Licence holders are not required to retroactively test packaged products that meet good production practices. They are required to test all new lots or batches of cannabis products that have not yet been released for sale once the mandatory testing requirements take effect.

As part of its unannounced inspections, Health Canada will continue to collect and test sample products from previously produced lots.

4. What pesticide active ingredients will licence holders be required to test for?

License holders will be required to test for all of the pesticide active ingredients on the Mandatory cannabis testing for pesticide active ingredients—List and limits that have limits of quantification.

The list is expected to evolve as laboratory capabilities, product information and availability, and risks change over time. Health Canada will review the list periodically and update it as needed, based on its monitoring of the industry and as laboratory technology advances. Changes to the list will be communicated in advance to regulated parties and stakeholders.

5. How did Health Canada determine the pesticide active ingredients that are to be tested by laboratories?

The Pest Management Regulatory Agency maintains a list of historical and current PCPs approved for use on specific crops in Canada and abroad.

Only certain PCPs have been approved in Canada for use on cannabis. PCPs that are of most concern or most likely to be used on cannabis were added to the Mandatory cannabis testing for pesticide active ingredients—List and limits if they:

- were detected on cannabis in Canada or in U.S. states that have regulated its production
- are used against pests that can be found on cannabis
- were observed by inspectors of Health Canada or the Canada Border Services Agency
- were identified because of their risk to health or the environment, or because of other factors

6. What test results must be reported to Health Canada?

Licence holders that requested the analysis must notify Health Canada every time pesticide active ingredient residues are quantified by a laboratory in a sample of a lot or batch of cannabis product. These laboratories must use a method that can reliably measure pesticide active ingredients in cannabis products at concentrations equal to or below the limits of quantification set by Health Canada.

7. Why do the limits of quantification for each pesticide active ingredient vary?

Limits are based on the identification and quantification of the molecule using current chemical analytical methods and equipment. They vary because each pesticide active ingredient has specific properties that affect the limit at which laboratories can quantify them with precision and accuracy. The limits were developed in collaboration with the analytical laboratory of the Pest Management Regulatory Agency and are set to a level at which most laboratories and analytical techniques can reliably measure their presence in cannabis.

It is expected that the limits established by Health Canada will be adjusted over time as laboratory technology advances. Changes to the limits will be communicated in advance to regulated parties and stakeholders.

8. What are sources of pesticide active ingredient contamination?

Sources of contaminants may include substances used in cultivation of cannabis; products for controlling structural pests and other products used as part of a sanitation program; fields adjacent to production facilities, which may cause agricultural residues to enter through ventilation intakes, or surface and well waters; refurbished facilities and equipment that may

have residues from past operations; or carrier oils which may have residues from the source crop cultivation.

Under good production practices, licence holders are expected to assess possible sources of contamination and adopt precautionary measures to prevent the adulteration of the cannabis they produce.

9. Are licence holders allowed to sell cannabis products that have been treated with unauthorized PCPs, as long as the levels are below the limit of quantification set by Health Canada?

No. Under the *Cannabis Regulations*, licence holders must not sell or provide cannabis products treated with an unauthorized PCP, regardless of the concentration of residues in the finished product. All PCPs used must be registered or authorized for use on cannabis under the *Pest Control Products Act*.

10. What constitutes a third-party laboratory for mandatory testing?

The laboratory must be a distinct entity that functions and reports independently of the licence holder requesting the analysis. Similar to the requirements that apply to licensed drug manufacturing establishments subject to good manufacturing practices, the laboratory must have access to adequate and separate facilities, equipment and trained personnel to fulfill its duties and responsibilities.

In addition, the laboratory must hold a licence for analytical testing under the *Cannabis Regulations*.

11. How will Health Canada know that licence holders are testing their products before they are made available?

Licence holders must keep a record of all test results, root cause analyses, and corrective and preventative action plans for a period of two years. These records must be available to Health Canada and will be reviewed as part of the inspection program.

In addition, Health Canada may collect samples at any point during an inspection and unauthorized use of PCPs is subject to compliance and enforcement action.

12. Why are licence holders required to test only end products? Should they not be required to test throughout the production process?

The primary goal of mandatory testing is to help ensure that individuals have access to quality-controlled products that were not treated or contaminated with PCPs that are unauthorized for use on cannabis. Testing end products is the most effective way to achieve this objective.

As part of its inspection program, Health Canada may test a sample at any point in the production process. Unauthorized use of PCPs is subject to compliance and enforcement action.

13. What should licence holders do when positive test results are received?

For affected products that have not been released for sale, the licence holder must notify Health Canada of the positive test results as soon as possible but no later than seven calendar days after receipt of the results. The licence holder must quarantine the product and begin a root cause analysis to identify the source of contamination. They are also required to implement a corrective and preventative action plan, as applicable, to prevent a reoccurrence.

Results that are reported to Health Canada are used to verify compliance with the Regulations, and to assess the level of risk to health or safety posed by the residues. Health Canada will initiate compliance and enforcement action as necessary.

If the products were sold, the licence holder must immediately stop selling the products and report the positive test results to Health Canada before commencing a recall.

14. Is the licence holder required to destroy cannabis products in which unauthorized PCPs have been detected?

Licence holders cannot sell products treated or contaminated with unauthorized PCPs. They could choose to destroy these products. Health Canada will assess other possibilities for destruction on a case-by-case basis.

10.0 Contact us

For more information about or to comment on the mandatory testing requirements, mail, fax or email:

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Appendix A: Best practices related to pest management and pest control product use for holders of a licence under the *Cannabis Act*

This appendix outlines best practices for pest management, to reduce the need for pest control products (PCPs) in cannabis production, and best practices for PCPs use for holders of a licence under the *Cannabis Act.*

PCPs are important tools to control insect, weed and disease populations. The use of PCPs during the production of cannabis has a direct impact on cannabis plant health and final cannabis products. Pesticides are regulated in Canada through a program of pre-market scientific assessment, enforcement, education and information dissemination. These activities are shared among federal, provincial/territorial and municipal governments and are governed by various acts, regulations, guidelines, directives and by-laws.

The Pest Management Regulatory Agency is the federal authority responsible for pesticide registration and re-evaluation as well as compliance and enforcement of the *Pest Control Product Act* and its Regulations. Provincial and territorial responsibilities may include the regulation of the transportation, sale, use and storage/disposal of pesticides; the training/certification and licensing of applicators and vendors; and compliance and enforcement within their jurisdictions. The role of municipalities is to enact by-laws, which may set further conditions on the use of pesticides.

Best practices

1. Implementing an integrated pest management program to reduce the reliance on PCPs for pest control during cannabis production.

An integrated pest management (IPM) program, as part of good production practices (GPP), is an approach to effectively and sustainably reduce pest populations. An IPM program coordinates many measures into a management program for a target pest. These measures could be biological, chemical, cultural or mechanical and may also include pest behavioural methods to reduce pest populations to acceptable levels.

Aspects of an IPM are:

- Prevent the pest problem: This involves proper identification of pest problems and their damage as well as their natural enemies. In addition, the growing environment is planned and managed to prevent the introduction and/or outbreaks of pests, including:
    - Using starting cannabis material that is free of pests
    - Sterilizing growing media before to planting
    - Using mechanical control of weeds such as “cultivating”

    - Sterilizing water and irrigation systems (e.g., using ozone, ultraviolet, or reverse osmosis)
    - Cleaning and sterilizing cultivation tools like secateurs and shears to prevent inoculation of disease
    - Ensuring employees do not introduce pests and that their clothing (e.g., hats, overalls, gloves, shoe covers) is pest free
    - Using filters or mesh in air vents to prevent pests from moving into and within the facility
    - Ensuring waste and/or unusable materials are stored in a way that makes them inaccessible to pests
- Frequent monitoring and record keeping: Frequent monitoring of pest populations, beneficial organisms (when present), pest damage and growing conditions conducive to pest outbreak is an important aspect of IPM, along with maintaining records related to pest monitoring. For insects and mites, trapping and monitoring provides information on pest activity, numbers, emergence and information to optimize spray timing.
- Ongoing assessment of pest control measures: Keeping a log of all measures used during IPM and evaluating the effects and efficacy of these measures

2. When using PCPs during cannabis production

- If PCPs are needed to control a pest, use only PCPs that are registered or otherwise authorized for use on cannabis and use them according to the label directions. The Pest Management Regulatory Agency's product label search tool can be used to determine which PCPs are registered and authorized for use on cannabis and industrial hemp in Canada. Pesticide labels are also accessible from a mobile device through the pesticide label search.
- If PCPs are needed to control pests that are not directly on the cannabis (e.g., during sanitation of the premises or the equipment, or for structural pest control):
    - Use only PCPs registered for that specific use
    - Read and carefully follow the instructions listed on its label
    - Prevent cross-contamination of growing areas (e.g., turn off the ventilation systems of an empty grow room during pesticide application)
- Put adequate controls in place in a facility to ensure that unauthorized PCPs are not used, such as:
    - Keeping all PCPs in a separate monitored and restricted area
    - Supervising employees who are preparing and applying PCPs to cannabis
- Put adequate measures in place to reduce the chance that external residues and PCPs contaminate the cannabis:
    - Testing inputs used during cultivation for contaminants (e.g., growing media or soil, water)

    - Establishing barriers to prevent contamination by extraneous pesticide residues (e.g., for indoor cultivation, filtration of the intake air; for outdoor cultivation, buffer zones and windbreaks around the fields)
- Regularly maintain, calibrate and clean equipment used to apply PCPs
- Have all personnel involved in pest control trained on proper application of PCPs and the steps necessary to prevent contamination
- Have an agronomist or a crop specialist who is responsible for pest management