Colorado Department of Public Health and Environment

Laboratory Service Division

Marijuana Flower Sampling Procedure

1. PURPOSE

The purpose of the Sampling standard operating procedure (SOP) is to outline a best practices procedure for the sampling of marijuana flower products for analysis by certified testing facilities.

2. TERMINOLOGY AND ACRONYMS

Aliquot – (To take) a portion or subsample from a larger sample

Division – Marijuana Enforcement Division, Colorado Department of Revenue (MED)

METRC – Marijuana Enforcement Tracking Reporting Compliance

Sample – Any item collected from a Marijuana Establishment or Marijuana Business provided to a Marijuana Testing Facility for testing. The following is a non-exhaustive list of types of Samples: Marijuana, Marijuana Concentrate, Marijuana Product, soil, growing medium, water, solvent or swab of a counter or equipment.

Sampling team – The facility or MED personnel, or other designated samplers, who have been assigned responsibility for sampling activities. The sampling team must, at minimum, consist of two individuals (one individual taking the sample and the other reviewing sampling information prior to entry into METRC and transport).

Test batch – A group of Samples from a specifically identified quantity of processed retail or medical marijuana that is uniform in strain, cultivated utilizing the same pesticides and other agricultural chemicals and harvested at the same time. The combined subset of Samples is collectively submitted for to a licensed testing facility for testing purposes.

3. EQUIPMENT AND SUPPLIES

Equipment (items used repeatedly)
Whirl-pak bags/ 40 mL VOA vials/ or equivalent
Metal/Disposable Spatulas
Forceps (sterile disposable)
Isopropyl Alcohol (≥70%)

METRC Manifest
Chain of Custody Labels
Security tamper evident tape

Custody seals
Sample labels
Ziploc bags
Cooler
Permanent ink pen
Equipment Logbook
Analytical balance or scale – The scale used to weigh product to be transported shall be tested and approved in accordance with measurement standards established in 35-14-127, C.R.S.

Supplies (items used only once)
Sterile nitrile/latex/rubber gloves
Ice/cold packs
Deionized Water

4. CONTROLS AND FREQUENCY

4.1 Sampling Frequency

Sampling shall be completed for each harvest batch as outlined in 1 CCR 212-1/2 R/M 1500 rule series.

4.2 Sample Amount

The Sample amount collected must meet the requirements outlined in 1 CCR 212-1/2 R/M 1500 and must be sufficient to complete the analyses as defined by the marijuana testing facility and/or Colorado Department of Agriculture. The samples should be collected and combined into a single package for submission to the laboratory.

Samples intended for pesticide testing must total an amount sufficient to complete three (3) separate analyses as required by the marijuana testing facility (see 1 CCR 212-1/2 R/M 1507 B.2.2).

4.3 Sampler Requirements

All samples must be collected by MED personnel or facility approved samplers in accordance with the Division's sampling regulations and/or rules. Facility approved samplers can be either internal personnel trained to collect samples or a third party authorized by the facility to collect samples.

Division personnel, at its sole direction, may assign Division personnel to collect samples. Marijuana businesses (recreational or medical), its owners, employees, or representatives shall not attempt to influence or interfere with the sample selection or collection process.

4.5 Sample Collection Data

The sampling document shall include the following information:

1) Person(s) performing the sampling and their company affiliation
2) Time and date of sampling
3) Strain/variety name
4) METRC Harvest Batch ID
5) Harvest date
6) Room ID (as the ID appears METRC)
7) Additional Comments – note anything that may affect the quality of the data analysis.
8) List of remediation, if any
9) Identify whether whole plant or subsection of plant was collected
10) Any deviations from sampling procedure and/or sampling plans
11) Person(s) reviewing the sampling process and their company affiliation

A witness shall review the labeled samples to the METRC manifest prior to the samples leaving the facility for each shipping event. The witness shall initial the manifest indicating the labels and manifest are accurate. The witness must be an independent person not involved in the initial sampling.

5. PROCEDURE

The procedure is designed to ensure that each sampling event shall produce samples that are representative of the harvest batch specified, regardless of whether the product or plant is grown for retail or medical purposes.

Sample Plan

A sampling plan generated by the person(s) responsible for the sampling event will be reviewed by the sampling team. This plan should include, at a minimum, the following information:

- Client/Affiliation Responsible & Contact Information (if different from those collecting the samples)
- Harvest batch size

- Sample Strain(s) to be sampled
- Sample procedure to be followed (i.e. lab specified, CDA specified, LSD SOP, etc.)
- Sampling locations to be collected (determined the Sampling Location Excel Spreadsheet).
- Testing facility performing the analyses
- Any other additional information necessary to guide the sample team through event-to-project specifications

The sampling plan shall ensure that samples are collected from the maximum number (all, if possible) of the harvest batch's storage containers. The sampling plan shall document the total number of storage containers that exist for a harvest batch and the number of containers utilized for sampling. An example sampling plan can be found in Appendix B.

5.1 Pre-Sampling Procedure

Equipment Preparation, Calibration and Environmental Controls

Sampling equipment shall be collected and organized into the area where the sampling shall occur and inspected prior to use. All spatulas/forceps shall be washed, isopropyl alcohol rinsed, and dried prior to sampling each batch.

Sample containers shall be new and inspected to be clean and dry prior to the sampling event. The appropriate amount of containers, defined by the marijuana testing facility and/or Marijuana Enforcement Division, shall be collected for the sampling event and packaged appropriately.

All required paperwork shall be pre-populated with pertinent information, as much as possible, prior to the sampling event.

5.2 Sample Collection

Minimum Number of Samples

At a minimum, each Test Batch of Retail or Medical Marijuana must be comprised of at least the following number of separately taken samples combined into a single test sample (i.e. each individually collected sample shall be combined with the others in a single container):

a. For Harvest Batches weighing up to 10 pounds, collect a minimum of 8 separate samples at 0.5 grams each.

b. For Harvest Batches weighing more than 10 pounds but less than 20 pounds, collect a minimum of 12 separate samples at 0.5 grams each.

c. For Harvest Batches weighing 20 pounds or more but less than 30 pounds, collect a minimum of 15 separate samples at 0.5 grams each.

d. For Harvest Batches weighing 30 pounds or more but less than 40 pounds, collect a minimum of 18 separate samples at 0.5 grams each.

e. For Harvest Batches weighing 40 pounds or more but less than 100 pounds, collect a minimum of 23 separate samples at 0.5 grams each.

f. For Harvest Batches weighing 100 pounds or more, collect a minimum of 29 separate samples at 0.5 grams each.

Sample Collection

The Samples shall be collected from product in its final, ready-for-sale state.

The sampler shall wear sterile nitrile, latex, or equivalent gloves during sample collection. The gloves shall be changed between each harvest batch to minimize potential cross contamination.

The flower collected for each sample shall be placed into the corresponding sample container using forceps.

The containers shall be labeled and sealed with tamper evident tape at the time of sampling.

All containers shall be stored at $6^{o} \pm 4^{o}$ C prior to transport.

Coolers shall be sealed and a custody seal or tamper evident tape placed on the cooler with the sampler(s) initials, date, and time.

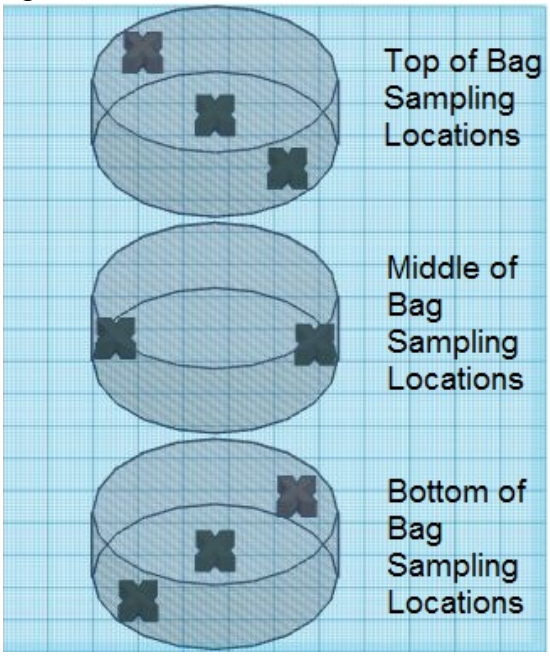
Harvest Batches in Storage Containers

For harvest batches where the harvest batch is picked flower stored in storage containers such as plastic tubs or turkey bags, the harvest batch containers shall be sampled in a spatial pattern to ensure that each region of the container has been sampled. This will ensure that each container has been sampled representatively.

The sample collection must be randomized to ensure that the storage containers throughout the batch are sampled. Each storage container shall be given a sequential numerical designation. Within each storage container there are eight (8) possible locations for sampling (see Figure 1 below).

The Sample Plan Flower spreadsheet shall be used to determine the random storage container numerical designation and sampling location from which each sample must be collected. The sample collection locations must be re-randomized in the spreadsheet for each Test Batch. The instructions for using the spreadsheet can be found in Appendix A.

Figure 1:



Harvest Batches Hanging on Drying Racks

For harvest batches being sampled from plant hanging on drying racks, sample in a spatial pattern to ensure that each region of the rack has been included. The racks shall be given a sequential numerical designation and the total number of racks will be entered into the spreadsheet for randomization, to ensure that each rack has been represented.

Within each drying rack there are five (5) possible locations for sampling (Figure 2). The five (5) locations are represented on the figure as small red circles. The red circles represent samples that should be gathered from two (2) locations at each end of the drying rack and one (1) sample gathered from the center.

If more than 5 samples are being collected, then samples shall be collected from different plants in these same locations.

The Sample Plan Flower spreadsheet shall be used to determine the drying rack numerical designation and sampling location for collection. The sample number designation and collection locations shall be re-randomized in the spreadsheet for each Test Batch.

Figure 2:

The entire plant shall be utilized in the collection of the sample. Due to the cannabinoid concentration and contaminant distribution variability at different levels of the plant, samples shall be taken from the lower, mid and top portions of the plant. The samples shall be collected to ensure that each third section of the whole plant is represented (see Figure 3).

Figure 3:

Drying Racks with Drawers

For drying racks that contain drawers where flower has been trimmed and picked the following approach shall be taken. Each drawer shall be labeled with a sequential numerical designation and the total number of drawers and racks shall be entered into the spreadsheet. The spreadsheet will randomize the drawers and locations for the collection of samples. The sample collection locations in each drawer are shown below in Figure 5. The instructions for using the spreadsheet can be found in Appendix A.

Figure 4:

Figure 5:

Drawer locations for sample collection shown by the red dots.

Small Harvest Batches

For harvest batches that are stored in single containers or small storage containers such as Ziploc bags, the Small Harvest Batch tab on the Sample Plan Flower spreadsheet shall be used.

The spreadsheet shall be printed and included as part of the sampling plan.

Sample Homogenization

The following is an example of one method to combine marijuana samples into one test sample.

EXAMPLE PROCEDURE

Place destemmed marijuana sample into the test sample container (Whirl-Pak bag).

Stir the marijuana sample by hand for sixty seconds using sterile metal or disposable spatula to help homogenize the sample. Or, alternatively, vigorously shake the container for sixty seconds to ensure the contents are well mixed.

Label the sample container and seal with tamper evident tape.

5.3 Post-sampling Procedure

Sample Collection Review

All samples collected shall be reviewed to the METRC manifest and/or the chain of custody for transporting the samples to the testing facility. A trained sampler or MED employee shall perform the review prior to sample submittal to the testing facility.

Equipment and Sampling Area Clean-up

The area where the harvest batch sampling occurs shall be cleaned, isopropyl alcohol rinsed, and dried between sampling harvests/batches.

Forceps and any additional sampling equipment (i.e., balances) shall be cleaned, isopropyl alcohol rinsed, and dried in between batches.

Sample Storage and Retention

Immediately store the samples under refrigeration or on ice and retain in a cool environment to ensure that the samples arrive at the testing facility at $6^{o} \pm 4^{o}$ C.

Protection / Preservation – other than thermal preservation, no other protection or preservation protocols have been developed or are required.

Samples shall be stored in a manner to prevent unauthorized access to samples and kept under custody seal until acceptance by the testing facility.

Samples shall be destroyed per applicable Colorado MED disposal rules.

5.4 Transport

Transport should be via a method to ensure that the samples arrive within two days to the marijuana testing facility at $6^{o} \pm 4^{o}$ C. Samples may only be transported by appropriately licensed personnel.

6. QUALITY RECORDS

Retained Quality Records

The following are the list of copies of reviewed documents to be retained for each harvest batch:

METRC sample manifest

Transport documentation
Acknowledgement of the testing facility sample receipt

Quality records shall be retained for a period of the current year and the proceeding three (3) years after analysis has been completed.

7. TROUBLESHOOTING

Not applicable

8. INTERFERENCES

Not applicable

9. HEALTH AND SAFETY WARNINGS

9.1 Solvents

All solvent handling must be in accordance to the facilities hazard communication plan, standard operating procedures, and/or the most recent Safety Data Sheet (SDS).

All waste, including any solvent waste, must be disposed of in accordance with local, state and federal regulations.

Use of solvents should only be carried out in well-ventilated area or in a fume hood.

10. REFERENCES

Not applicable

11. REVISION HISTORY

Version Number	Version Date	Description of Change
Revision 0	12/27/2017	Initial Release

12. APPENDICES

Appendix A: Spreadsheet Instructions

The Sample Spreadsheet is comprised of several tabs. The tabs are organized by the different types matricide. The spreadsheet has orange highlighted fields where the user will enter information based on the batch size and the number of samples to be collected.

Bags & Containers Tab

The Bags & Containers spreadsheet should be utilized if the harvest batch is being stored in turkey bags or plastics tub. The number of samples shall be determined in the Minimum Number Samples section above. The minimum number of samples is determined by the weight of the harvest batch. The weight of the harvest batch and the number of storage bins should be entered into the orange highlighted cell. The spreadsheet will automatically provide the total number of samples and the number of samples required per each storage bin/container. The samples shall be collected randomly as outlined in this SOP.

Drying Racks Tab

The Drying Racks spreadsheet should be utilized if the harvest batch is being stored on drying racks. The Number of samples shall be determined in the Minimum Number Samples section above. The weight of the harvest batch and the number of drying racks should be entered into the orange highlighted cells. The spreadsheet will automatically provide the total number of samples and the number of samples required per each drying rack

Drying Racks with Drawers Tab

The Drying Racks spreadsheet should be utilized if the harvest batch is being stored in drying racks with drawers. The Number of samples shall be determined in the Minimum Number Samples section above. The weight of the harvest batch and the number of drawers should be entered into the orange highlighted cells. The spreadsheet will automatically provide the total number of samples and the number of samples required per each drawer.

Appendix B: Sampling Plan Example

The following is an example of a sampling plan. Any sample plan format that contains the information in the sampling plan section is acceptable.

Sampling Plan

Facility Name: _____

Location:

_____

_____

Sampler Name: _____

METRC ID: _____

Batch ID: _____ Batch Size: _____

Strain/Product ID: _____

Sampling Procedure: _____

Sampling Locations (Attach print out from the Sampling Location Excel spreadsheet)

Testing facility: _____

Reviewed by: _____

Date: _____