

Standard Operating Procedures for Hemp

SAMPLE GRINDING



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Standard Operating Procedures
for Hemp - Sample Grinding

NPL-SOP-EQP-001.01
Sample Grinding

NATURAL PRODUCTS LABORATORY		OREGON STATE UNIVERSITY COLLEGE OF AGRICULTURAL SCIENCES ENVIRONMENTAL & MOLECULAR TOXICOLOGY
DOCUMENT TITLE General Sample Grinding Procedure		DOCUMENT#(NAME-TYPE-NUMBER.REVISION) NPL-SOP-EQP-001.01
ORIGINALLY PREPARED BY Jennifer Duringer	APPROVED BY (LABORATORY DIRECTOR) Jennifer Duringer	REVISED BY
DATE CREATED 05/22/2022	LAST REVISION DATE 05/22/2022	UNCONTROLLED UNLESS STAMPED HERE

**STANDARD OPERATING PROCEDURE
GENERAL SAMPLE GRINDING PROCEDURE**

1.0 Purpose

This is a general procedure for the use of sample mills and grinders for sample preparation. Sample mills and grinders are used in the Natural Products Laboratory to create a homogenous powder for solvent extraction and analysis.

2.0 Scope

This document applies to the general grinding of samples in the Natural Products Laboratory. More detailed information is provided on the operation and maintenance of this specific grinder in its manual.

3.0 Definitions

- 3.1 Grinder – Machine used to break solids into a powder-like substance.
- 3.2 Homogenous powder – Thoroughly ground and mixed plant material, acceptable for use in sample analysis.

4.0 Responsibilities

- 4.1 Laboratory Personnel – All laboratory personnel shall be responsible for the proper operation and maintenance of the grinding equipment.
 - 4.1.1 All laboratory personnel shall follow this document, in conjunction with additional equipment-specific documents, when grinding material for sample analysis.
- 4.2 Laboratory Supervisor/Director – The Laboratory Supervisor/Director shall be responsible for ensuring that all laboratory personnel, who operate the grinders under their supervision, are trained and competent in the contents of this SOP.

5.0 Materials

5.1 *Equipment*

- Foss Cyclotec 1093/UDY Cyclone sample mill or equivalent
- 0.5, 1.0 or 2.00 mm screen or equivalent
- Sample bottles, Foss (Z310003679)/UDY (30-0387) or equivalent
- 4” x 6” sample bags, VWR (89005-346) or equivalent
- Benchtron down draft table, Clean Air Consultants (BFS8-6-5H) or equivalent
- Cleaning brush, VWR (17130-022) or equivalent
- Allen wrench for impeller screw
- Shop Vacuum, Craftsman (9-17765) or equivalent
- Wet/Dry HEPA Filter, Cleanstream (09085) or equivalent
- Compressed air at ~145 psi

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5.2 *Chemicals*

- Purified Reverse Osmosis Grade Water (H₂O), 10.0-15.0 MΩ·cm or equivalent

6.0 Safety

- 6.1 Wear safety glasses and a lab coat while grinding. To prevent contamination, the laboratory coat used for sample grinding is not be used when in the laboratory environment.
- 6.2 Position the grinder within the down draft ventilation system to decrease particle levels in the air. To prevent contaminating personnel, treat all samples as potentially toxic.
- 6.3 Hearing protection should be worn while operating this unit.
- 6.4 Overheating can occur with certain sample types and volumes. If the outside of the grinder is warm, turn off the grinder and open the grinding chamber until the metal returns to ambient temperature. The grinder temperature should be monitored to avoid loss of sample quality.
- 6.7 The grinder cover shall remain with the equipment, and properly used, to eliminate any risk from the impeller blade. Caution and safe practices should be used when cleaning the impeller blade.

7.0 Procedure

- 7.1 Non-dry plant material is to be air-dried out of direct sunlight. Place sample material in an enclosed brown, paper bag or between layers of newspaper. Allow the material to dry in a fume hood overnight, or until the material is dry to the touch.
- 7.2 *Grinding Setup*
- 7.2.1 Ensure that the drawers to the down draft table are clean.
- If there is debris in the drawers, vacuum the base to remove the sample material.
- 7.2.2 Turn on the Benchtron down draft table and record the filter readings in the appropriate boxes of the data tracking form (Figure 1).
- Filter labels are kept next to the filter readings, to ensure that the filter is performing properly (Figure 2).
- 7.2.3 Turn on and connect compressed air lines, if not already performed.
- If connecting the compressed air, ensure the lines are clear of moisture by visual inspection prior to securing the connections.
- 7.2.4 Ensure the grinder is clean, dry and properly positioned on the Benchtron grate before use.
- If the grinder appears dirty, refer to the cleaning steps outlined in 7.3.14.
- 7.2.5 Insert the main power cord of the grinder into the grounded-type electrical outlet within the ventilation system.

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7.3 *Sample Grinding*

- 7.3.1 Sub-sample the material by removing small, equally-sized quantities from several areas in the original container. Combine all of the aliquots in the large inlet funnel of the grinder.
 - i. For longer samples, remove three separate sub-samples from two sides of the container: top, middle, bottom or left, middle, right.
 - ii. For smaller samples, removed five separate sub-samples from two sides of the container: top right, top left, middle, bottom right, bottom left.
- 7.3.2 Place a waste collection bottle under the outlet funnel of the grinder.
- 7.3.3 Turn the grinder “ON.”
- 7.3.4 Grind a small portion of the sample, to condition the grinder to the sample material.
- 7.3.5 Turn the grinder “OFF” and remove the waste collection bottle.
- 7.3.6 Label a ziplock-type bag with the accession number, pertinent sample identification from the original sample container, date ground and initials.
- 7.3.7 Line the inside of a clean, empty sample collection bottle with the labeled sample bag.
- 7.3.8 Place the sample collection bottle under the outlet funnel of the grinder.
- 7.3.9 Turn the grinder “ON.”
- 7.3.10 Grind small portions of the sample, until the sample begins to fill the outlet funnel.
- 7.3.11 Turn “OFF” the grinder, carefully removing the sample collection bottle from the grinder outlet.
- 7.3.12 Remove the sample bag from the collection bottle. Close the bag with an air pocket. Thoroughly mix ground sample material by sliding the sealed sample bag between the thumb and index finger several times.
- 7.3.13 Immediately store the ground, sample bag protected from light.
 - i. Best practice is to store the sample in a brown, paper bag or a lab coat pocket.
- 7.3.14 After each portion of sample is ground, clean the grinder with compressed air and a dry brush to prevent cross-contamination (NPL-SOP-EQP-002).
- 7.3.15 When grinding is complete, turn off the Benchtron down draft table and store all ground samples at -20°C.
- 7.3.16 Record fulfillment of sample grinding in the log file for the appropriate project/experiment location.
 - i. In the notes section, the individual or individual’s supervisor should record “Sample ground by (initials and date).”

7.4 *Weekly Maintenance*

Perform these steps at the conclusion of grinding for the week, to allow time for the grinders to air dry before subsequent use.

- 7.4.1 Thoroughly clean the grinder with water, to remove any residual plant

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material. Wipe each grinder accessory which contacts sample material with a damp sponge.

7.4.2 Turn off the compressed air and empty all lines of residual air. Disconnect the lines.

8.0 References

- Tecator Cyclotec 1093 Sample Mill Manual. Tecator, Box 70, S-263 21 Hoganas, Sweden.

9.0 Change History

Revision Number	Effective Date	Significant Changes
.00	05/22/2022	Document was created.

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Attention

HEPA FILTER MAINTENANCE
MAGNEHELIC PRESSURE

1.5-4.5=NORMAL
5.0+ CHANGE FILTER

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MAGNEHELIC PRESSURE

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