

Plant Tissue Analysis

How to collect, handle, and ship leaf samples for tissue testing

THE KEY RULE

A tissue test is only as good as the sample. Collect the correct plant part from the correct growth stage, keep soil and dust out of the bag, label everything clearly, and get the sample to the lab quickly.

1 WHEN TO USE TISSUE ANALYSIS

Use tissue testing as a snapshot of what the plant has taken up at the time of sampling. It is most useful when paired with a recent soil test, field observations, crop stage, yield goal, and weather history.

- **Routine monitoring:** sample healthy, representative crop areas at the same stage each year to track nutrient trends.
- **Diagnostic sampling:** if a poor area is showing symptoms, take two separate samples on the same day - one from the poor area and one from a nearby normal area
- **In-season correction:** earlier sampling gives more opportunity to act. Late sampling is still useful as a report card for next year.

2 WHAT TO BRING TO THE FIELD

- Clean paper sampling bags or lab-provided plant tissue envelopes
- Permanent marker and sample labels
- Clean scissors or knife; disposable gloves if leaves are dirty or treated
- Cooler with ice pack for hot days or long routes
- Field map or phone GPS for marking sample zones
- Submission form, crop stage notes, and spray/fertility history

3 CHOOSE THE RIGHT SAMPLE AREA

- For a uniform field, walk a zigzag or W pattern through the zone and collect from many plants, not one spot.
- Keep separate management zones separate: soil type, irrigation vs. dryland, manure history, salinity, slope, compaction, and yield zones can all change tissue results.
- For a problem field, collect paired samples: Problem Area and Normal Area. Do not mix them in the same bag.
- Avoid field edges, drowned-out areas, headlands, wheel tracks, manure piles, obvious spray overlaps, and areas that do not represent the zone you want to understand.

4 STEP-BY-STEP: FROM PICKING LEAVES TO THE LAB

- 01 Stage the crop first.** Write down crop stage before sampling. Nutrient levels change quickly with growth stage, and the correct plant part can change as the crop develops.
- 02 Pick the correct plant part.** Use the crop guide below or your lab instructions. For many crops, the best general plant part is the most recent fully mature leaf: fully expanded, green, not shiny-new, and not old or damaged.
- 03 Collect enough plants.** A useful target is leaves or tissue from at least 20 plants, or about 2 cups / one loosely filled lunch bag of fresh tissue unless your lab gives a different amount.
- 04 Keep it clean.** Shake or gently brush off soil and dust. If leaves are muddy or dusty, lightly rinse with distilled or deionized water only, then air-dry before bagging.
- 05 Bag immediately in paper.** Place tissue in a paper bag or lab tissue envelope. Do not seal fresh leaves in plastic; moisture buildup can spoil the sample.
- 06 Label before leaving the field.** Write sample ID, field, zone, crop, variety/hybrid, growth stage, plant part, date, and sampler name on the bag.
- 07 Keep cool, not frozen.** If you cannot ship or deliver the same day, keep samples cool and ventilated. Refrigerate overnight if needed; do not freeze.
- 08 Ship promptly.** Use a sturdy box, keep bags loose enough for airflow, include the form in a separate plastic sleeve, and ship early in the week with tracking.

IMPORTANT: SAP VS. DRY TISSUE TESTING

Dry tissue samples are commonly placed in paper bags so they can breathe. Sap samples are normally kept fresh in sealed zipper bags to reduce moisture loss before the lab extracts sap. Always follow the specific packaging instructions from the sap lab.

5 CROP QUICK GUIDE: WHAT TO COLLECT

Use this table as a practical starting point. Lab instructions overrule this table when they differ.

Crop	Best Timing	Plant Part to Collect	Typical Amount
Wheat, barley, durum, oats	After plants are well established; stem extension is often useful for in-season decisions	Newest fully developed upper leaf. In early tillering, lab may request above-ground or base leaves.	Full sandwich bag or about 80–150 g per bag
Cereals: wheat, barley, oats, durum	Early vegetative to heading	Early: whole above-ground plant. Taller crop: top two leaves or upper leaves. At heading: flag leaf.	30-50 plants or leaves
Canola	Seedling/rosette through flowering	Early: whole above-ground plant. Bolting/flowering: uppermost fully developed or first fully mature leaves.	20-30 plants/leaves
Corn	V3 to silking	Up to V6: whole plant. V7 to pre-tassel: youngest fully developed leaf. Silking: ear leaf below and opposite the ear.	15-25 plants/leaves
Peas, lentils, chickpeas, dry beans	Vegetative to early flower/pod	Most recent fully mature leaves from the upper canopy. For crop-specific petiole tests, follow lab instructions.	25-30 plants/leaves
Flax	Bud to flowering	Upper canopy mature leaves or upper third of plant, depending on lab protocol.	30+ plants/leaves
Alfalfa and forage stands	Prior to bloom or before cutting	Top 6 inches, or cut at normal mowing height for a forage stand sample.	Enough to loosely fill a paper bag
Mixed cover crops	Active growth	Sample the main species of interest separately, or request a forage/biomass analysis for the mixed stand.	Enough to loosely fill a paper bag

Most recently fully mature leaf (MRML)

The MRML is usually the youngest leaf that has reached full size. Avoid very young shiny leaves and older lower leaves unless the lab specifically asks for them.

6 WHAT NOT TO SAMPLE

- Dead, dried-out, diseased, insect-chewed, hail-damaged, or mechanically injured tissue
- Plants from headlands, wheel tracks, field edges, saline spots, old yard sites, or obvious overlap areas unless sampled as separate diagnostic zones
- Plants under extreme heat, drought, flooding, frost, or herbicide stress unless that is the diagnostic question
- Roots, soil, seed heads, pods, or stems unless the test instructions specifically request them
- Leaves covered with soil, dust, fertilizer granules, foliar nutrient residue, manure, or spray deposits

7 CLEANING & HANDLING THE SAMPLE

GOOD HANDLING

- Use clean hands/gloves and clean tools.
- Brush off soil before bagging.
- Air-dry damp leaves before closing the bag.
- Keep sample bags open or loosely folded for airflow.

AVOID

- ✗ Do not seal fresh tissue in plastic.
- ✗ Do not place forms directly with wet leaves.
- ✗ Do not wash with tap water if micronutrients are being tested.
- ✗ Do not freeze samples.

8 LABELLING & SUBMISSION FORM

Label the bag and the submission form so the lab report can be matched back to the exact field and zone. Use the same sample ID on the bag, form, and your field notes.

Record this	Example
Sample ID	Field 7 – Normal , Field 7- Poor
Crop and variety / hybrid	AAC Brandon wheat; Invigor canola hybrid
Growth stage & plant part	Wheat flag leaf; canola flowering upper mature leaf
Field / legal land / GPS or zone	NW 12-8-2 W4; south knoll; pivot corner
Recent fertilizer and foliar products	Seed-placed blend, side-band N, foliar micros, manure history
Recent pesticides and timing	Herbicide/fungicide/insecticide dates; avoid contaminated leaves
Stress notes	Dry, saturated, saline, compacted, hail, frost, heat, disease, insects
Requested analysis	Routine tissue package; nitrate petiole; full nutrient panel

8 PACKING AND SHIPPING PROCEDURE

- Check that every bag is labeled and matches the submission form.
- Use paper bags or lab envelopes for tissue. Put paperwork in a separate waterproof sleeve or plastic bag.
- Pack bags loosely in a cardboard box. Do not compress wet green tissue tightly.
- Ship as soon as possible, ideally Monday to Wednesday, so the sample does not sit over a weekend or holiday.
- Use tracking and keep the tracking number until results are received.
- If samples must sit overnight, refrigerate in paper bags. Do not freeze.

BEFORE YOU CLOSE THE BOX, ASK YOURSELF

Can the lab clearly identify the grower, sample ID, crop, stage and plant part?

What is your requested analysis?

Where did the sample come from?

If yes to all, the sample has a much better chance of producing useful results.

9 HOW TO UTILIZE THE RESULTS

- Do not interpret tissue results without crop stage, plant part, and field context. A number can be misleading if the wrong leaf was sampled.
- Compare like with like: same crop, same stage, same plant part, same lab, and similar field conditions.
- Use paired normal/poor samples for diagnosis. The difference between the two often tells a better story than one sample alone.
- Use results with soil test data, weather, rooting conditions, compaction, salinity, herbicide history, irrigation, and yield maps before making a fertilizer decision

10 FINAL FIELD CHECKLIST

- | | | |
|--|---|--|
| <input type="checkbox"/> Crop and field/zone identified | <input type="checkbox"/> Crop stage recorded | <input type="checkbox"/> Correct plant part selected |
| <input type="checkbox"/> 20+ plants sampled across the zone, or lab minimum met | <input type="checkbox"/> Soil/dust brushed off; damp tissue air-dried | <input type="checkbox"/> Tissue placed in paper bag, not plastic |
| <input type="checkbox"/> Bag labeled with sample ID, crop, stage, plant part, date | <input type="checkbox"/> Form completed and kept separate from wet tissue | <input type="checkbox"/> Sample kept cool and shipped promptly with tracking |

REFERENCES

AGVISE Laboratories - Plant Sampling Basics; Plant Analysis Sampling Guide

Ward Laboratories - Tissue Testing and Plant Tissue Sample submission guidance

Field Crop News / OMAFRA - A Guide to Plant Tissue Sampling, 2025

A&L Canada Laboratories - Plant Tissue Submission Sheet Centre

University and extension plant tissue sampling references for crop stage and plant part guidance

Important note: Confirm current sample bags, submission forms, mailing addresses, and crop-specific instructions with the lab before the sampling season.

NEED HELP WITH TISSUE SAMPLING THIS SEASON?

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