SOIL TESTING QUICK GUIDE

A guide to quickly assessing soil quality for optimal plant growth.

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NCIAF SOIL SAMPLING & TEST INTERPRETATION – QUICK GUIDE

This toolkit will help you to gain a basic understanding of:

- Why soil sampling is important.
- How to soil sample (size of sample, where to take it).
- Which components in soil help or hinder plant growth.

These toolkits will help to reinforce that healthy soil needs to be taken care of in order to produce healthy food:

- Interpreting Soil Test Reports (provided by SGS Crop Canada Inc)
- SGS Soil Sampling Guide July 2021
- OMAF Vegetable Recommendation Tables 2014
- SGS Soil report Example

Why Soil Sample?

Soil sampling is a fundamental tool in sustainable crop production, providing essential data to guide the efficient and effective use of fertilizers and lime. It helps identify nutrient deficiencies or imbalances, diagnose problem areas within fields, and monitor soil fertility trends over time.

Obtaining a Soil Sample

The optimal time to conduct soil sampling is in the fall, after harvest, when field conditions are still suitable. This allows sufficient lead time to analyze results, review recommendations, and make fertility plans ahead of spring planting.

For **garden production**, sampling is important to do every fall or at least every two years. Sampling only the top 4-6" of soil with a garden trowel is plenty. Take single scoop samples from various locations in the garden and combine. Soil testing can be completed effectively from a sample of soil approximately the size of a pound of butter.

Soil Sampling for Field-Scale

For **field scale** production, sample each field every three years. For sandy soils or fields used to grow crops with high nutrient removal, such as tomatoes, corn silage, and alfalfa, more frequent testing is recommended.

When collecting samples, use a stainless-steel soil probe or auger and a clean plastic pail to avoid contamination, particularly when testing for micronutrients. For most nutrient analysis, collect samples to a depth of 15 cm (6 inches). For nitrate testing, a deeper sampling depth of 30 cm (12 inches) is necessary. Each composite sample should consist of at least 20 soil cores per 10 hectares (25 acres), thoroughly mixed to ensure a representative sample.

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To obtain accurate results, avoid collecting soil from non-representative areas, including:

- Field borders, headlands, or zones with frequent equipment overlap.
- Treed perimeters where leaf fall may skew test results.
- Highly eroded knolls, compacted areas, or former lime/manure piles.
- Dead furrows or low-lying drainage areas.

Once samples are collected, label them clearly and record their origin, linking each sample to a specific field or zone. Effective record-keeping should include details such as:

- Crop history and crop rotation.
- Fertilizer and lime application rates and timing.
- Observed weather patterns or stress conditions.
- Final yields and any unusual field observations.

Property	Function (Simple)	Deficiency/Imbalance Symptom	Ideal Soil Level (ppm)
Soil pH	Nutrient availability	Too low = acidic, ties up P, Ca, Mg; Too high = alkaline, ties up Fe, Mn, Zn, Cu	6.0 – 7.0 (most crops) 5.5 – 6.5 (potatoes, blueberries)
Buffer pH	Lime requirement	Not a “deficiency” but indicates how much lime is needed to raise soil pH	Used by labs to calculate lime rate (no “ideal,” just interpret with soil pH)
Organic Matter (OM)	Soil life, water, nutrients	Low OM = poor water holding, compaction, weak soil biology	3 – 6% for productive soils >6% excellent (gardens, black soils)

Definitions:

- **Soil pH =** how acidic or alkaline your soil is. Sweet spot is near neutral (6–7) where most nutrients are available.
- **Buffer pH =** lab test used only to decide how much lime is needed if your soil is too acidic. You don’t manage this directly
- **Organic Matter =** decomposed plant/animal material. Boosts fertility, water retention, and microbial life. Most gardens benefit from adding compost to raise OM.

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Nutrient	Function (Simple)	Deficiency Symptom	Ideal Soil Level (ppm)
Nitrogen (N)	Growth, leaves	Pale yellow, stunted	25–50 (nitrate-N, varies widely by crop)
Phosphorus (P)	Roots, energy	Purplish leaves, poor flowering	15–40 (Olsen P)
Potassium (K)	Water balance, quality	Yellow/brown leaf edges	40 ppm
Magnesium (Mg)	Photosynthesis (chlorophyll)	Yellowing between veins (older leaves)	50–120
Calcium (Ca)	Structure, new growth	Blossom end rot, tip burn	1000–2000
Sulphur (S)	Protein, flavor	Uniform yellowing of new leaves	10–20
Zinc (Zn)	Hormones, leaf size	Small leaves, short stems	1–3
Manganese (Mn)	Photosynthesis enzymes	Yellowing + brown speckles	5–20
Copper (Cu)	Reproduction, strength	Twisted leaves, poor seed set	0.5–2
Iron (Fe)	Chlorophyll, energy	Yellow young leaves, green veins	2–5
Boron (B)	Flowers, fruit, sugar	Brittle tissue, misshapen fruit	0.5–1.5

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The NCIAF would like to acknowledge and thank **SGS Canada** for their expertise and contributions to the development of this toolkit.

Resources Links

Appendix A: Interpreting Soil Test Reports (SGS)

Appendix B: SGS Soil Sampling Guide July 2021

Appendix C: OMAF Vegetable Recommendation Tables 2014 (SGS)

Appendix D: SGS Soil report Example (with comments vegetable)