

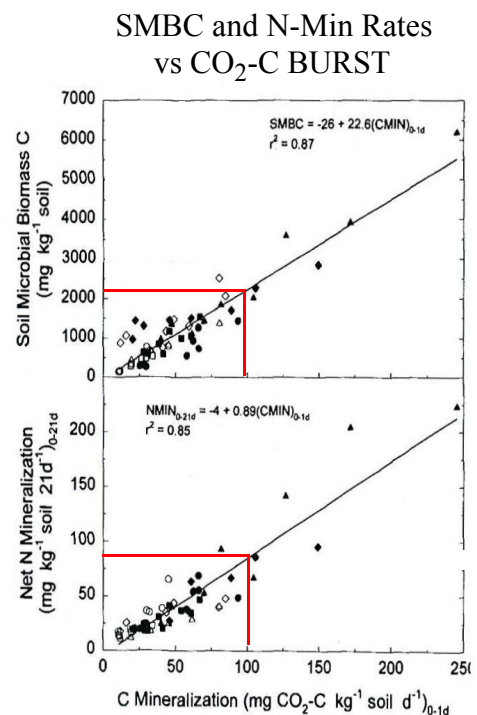
PROFESSIONAL SOIL TEST INTERPRETATION

BASED ON THE DRYING-REWETTING PULSE

Test Result ppm CO ₂ -C	N-Mineralization Potential	Biomass
> 100	High N-Potential soil. Likely sufficient N for most crops.	Soil very well supplied with organic matter. Biomass >2,500 ppm
61 - 100	Moderately-high. This soil has limited need for supplemental N.	Ideal state of biological activity and adequate organic matter level.
31 - 60	Moderate Level. Supplemental N is most likely indicated.	Requires new applications of stable organic matter. Biomass <1,200ppm
6 - 30	Moderate-Low - will not provide sufficient N for most crops	Low in organic structure and microbial activity. Biomass < 500ppm
0 - 5	Little biological activity; requires significant fertilization.	Very inactive soil. Biomass < 100 ppm. Consider long-term care.

N-mineralization and microbial biomass can be estimated based on the 24h soil-CO₂ burst as shown in the instance at the right. The quantity of soil microbial biomass is generally about 20-times the CO₂-C rate. The net nitrogen release varies per unit of CO₂ burst and is generally 0.7-1.0 times the indicated CO₂-C rate, and is higher with better humus quality. A conservative but reliable estimate for N-release in lb/a is to take half the CO₂-C rate as indicated by the Solvita test. This amount of N can be subtracted from fertilizer rates.

The response of soil to additions of manure or compost generally results in linear CO₂ increases so long as the C:N of the additives is below 20. The effect will decline slowly over time. Research trials show that each added 10-ton/a of stable compost increases soil respiration by about 0.1 Solvita Unit or about 2-3 ppm expressed as CO₂-C. For an acre slice of soil, weighing 1 million kg (2-million lbs) this is 2kg (4 lbs) of carbon or 7.5kg (15-lbs) of CO₂.



SOLVITA® QUICK-GUIDE SOP‡

SOIL RESPIRATION PROFESSIONAL TEST

TESTING SOIL RESPIRATION: The pulse of carbon dioxide (CO₂) following moistening of pre-dried soil is a common phenomena of agricultural soils, and is believed to indicate biomass and nutrient release potential. The professional Solvita test procedure is carefully designed to express this trait and thereby to provide a tool for measuring microbial biomass and nutrient mineralization potential.

The Solvita Soil Test is the new and revolutionary method to readily and accurately measure soil CO₂ respiration. The test is available in two forms: a semi-qualitative (Basic or Basal) and an advanced (Professional or Pulse) procedure.

Professional SOLVITA TEST

(Solvita items # 100-S DCR, 2351, 2352, 2353)



weigh dry soil into capillary cup after placing fiber filter in the bottom



place beaker containing 40g soil into glass jar



add 25cc water into glass jar but avoid spilling on soil



insert CO₂ probe



After 24 hrs read the probe result by inserting into the DCR to record ppm of CO₂-C

1. **Taking SOIL:** A sample of fresh soil is collected according to proper sampling protocols. Previously sampled, stored soils may also be used for the procedure.
2. **DRYING-REWETTING:** For moist soil, place a suitably large (100g) quantity in a lab convection oven at 40-50°C for at least 24 hours or until completely dry. The soil should then be ground in a soil-mill and sieved to 2mm sizing.
3. **PLACE SAMPLE IN BEAKER:** Insert the enclosed fiber filter into bottom of the included plastic re-wetting beaker. Weigh 40g of the pre-dried and sieved soil into the beaker. Place the plastic beaker into the *glass jar* provided. The beaker has holes in the bottom to aid water entry.
4. **INITIATE PROCEDURE:** Add a 25cc aliquot of DI water into the glass jar, but not into the beaker containing the soil (see image). This amount of water will be more than sufficient to bring most samples to full water capacity by capillary action. After the water has been added, tear open the Solvita “Low-CO₂” package and carefully remove the probe from the foil pouch. *Do not touch the gel surface, and don't allow soil to touch it.* At the start of the test the gel should be color #0 (bright blue).
5. **INSERT PROBE:** Using plastic tweezers carefully place the CO₂-probe into the glass jar alongside the plastic beaker. Put the gel facing out next to the clear side of the jar. Screw the lid on tightly and record the time.
6. **COMPLETE THE TEST:** Keep the jar under stable room temperature conditions of 22-25°C for 24 hrs. At 24 hours read the color of the probe by inserting into the Digital Color Reader. The DCR reports the color chart number on the first line, and the mg/kg CO₂-C on the second line
7. **INTERPRET** results by referring the charts on the following page.

‡ NOTE: for best results refer to the full instructions provided with the kit.