



<http://mvtl.com>

1314 South Front Street
New Ulm, MN 56073
507-354-7645
mnsoil@mvtl.com

1201 Lincoln Way
Nevada, IA 50201
515-382-5486
mvtlia@mvtl.com

Solvita® Soil Test Information (24 Hr. CO₂ Burst)

Soil is a complex ecosystem that provides a habitat for an endless array of micro and some macro organisms. These include bacteria, fungi, protozoa, nematodes, earthworms, etc. These organisms are responsible for much of the nutrient cycling that takes place in the soil. They decompose crop residues, store plant nutrients, create stable organic matter in the form of humic acid, and help build soil structure. This leads to reduced soil compaction and erosion, while increasing water holding capacity and a deeper root zone. The relationship between different microorganisms and plants is dynamic. The predatory action of protozoa on bacteria helps release nitrogen into the soil and symbiotic bacteria and fungi aide the plant in acquiring more nutrients. Through better understanding of soil microbial communities we can begin to allow these organisms to work for us in our goal of high yielding, sustainable agriculture.

Many microorganisms give off carbon dioxide (CO₂) as a result of aerobic respiration. The Solvita® CO₂ Burst test quantifies the amount of respired CO₂ after rewetting a dry soil sample, employing a pre-calibrated CO₂-absorbent gel. The amount of CO₂ measured over a 24 hour period represents “active carbon” or “respirable carbon” that was acted upon by the microbes and may also be used to estimate potential mineralizable nitrogen and phosphorus from the soil organic matter. Soil microbial biomass plays a critical role in controlling the supply of nitrogen and phosphorus to crops. The turnover and activity of soil biomass may account for more than 50% of the total crop nitrogen uptake. Therefore, the rate of soil biological activity should serve as a reliable index of the soil’s capacity to supply nitrogen, and perhaps other nutrients such as phosphorus, to crops. Studies in the past 10 years have shown the flush of CO₂ following drying and rewetting of soil mimics some natural processes and characteristics of long-term incubations and has been observed to correlate with nitrogen supply potential. The quality of soil carbon (C:N ratio) and supply of nutrients and moisture will have a significant effect on the exact ratio of biomass measured as evolved CO₂ and nutrient release.

In general, soils that exhibit a higher CO₂ flush are considered to contain greater microbial biomass due to a more favorable food supply, leading to an increased potential for activity and nutrient turnover/mineralization. Management practices employing no-till, manure, and cover crops help increase the amount of quality food available to microorganisms and the Solvita® test allows producers to track such changes over time in response to management. In addition, Solvita® has been incorporated into other testing procedures such as the Haney Test, which provides a more comprehensive measure of soil health using Solvita® as one of the test’s foundations.

| Test Result 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>2500 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<1200 ppm |
| 6-30 | Moderate-Low-will not provide sufficient N for most crops | Low in organic structure and microbial activity. Biomass,500 ppm |
| 0-5 | Little biological activity; requires significant fertilization | Very inactive soil. Biomass<100 ppm. Consider long-term care |

Additional information is available on the MVTl’s website at www.mvtl.com Questions regarding soil health testing may be directed to Brian Williams, bwilliams@mvtl.com or call 507-766-3319.