**Haney Test Explanation**

This program, developed by Rick Haney of USDA-ARS, is designed to assess soil health by utilizing "green chemistry." It can be used on any soil type and management scenario. The "green chemistry" includes water, soil microbial indicator, and a weak organic acid (H3A).

Soil samples are taken at **0-6” depth** and submitted to Midwest for analysis. Samples are dried at 50°C and ground to pass through a 2 mm sieve. About 4 grams of dry soil is weighed into each of two tubes and a third sample of 40 grams is weighed into a perforated beaker that can allow infiltration of water. One of the tubes with the 4 gram sample has water added and the second tube has H3A added. The tubes are shaken for 10 minutes to ensure extraction, centrifuged, and then filtered. The extracts are analyzed for nitrate, ammonia, phosphate, and minerals including aluminum, iron, phosphorus, calcium, magnesium, and sodium. The perforated container is placed in a jar with water and a Solvita paddle, capped, and allowed to sit for 24 hours. After the 24 hour period, the Solvita paddle is read.

**N - P - K**

The results for these represent the amount of nitrogen, phosphate, and potash in the soil in lbs. per acre. The results include the inorganics nitrate, ammonia, and phosphate from the H3A extract and the nitrogen and phosphorus the soil microbes can provide through microbial activity. The inorganic nitrogen (ammonia and nitrate) can easily be lost through plant uptake or erosion/leaching.

**Soil Health Tests and Explanations**

**Solvita 1 Day CO2-C:**
This test is one of the most important numbers in the soil health report. The result (in ppm) is the amount of CO2-C released in a 24-hr. period from soil microbes after the soil has been dried and re-wetted and is an indication of the microbial activity of the soil. The microbial activity is an excellent indicator of soil fertility. As soil microbes grow and reproduce, they take in nutrients and give off carbon dioxide as a by-product and the greater the amount of carbon dioxide, the greater the microbial activity.

**Water-extractable organic Carbon:**
The result has units of ppm and is a measurement of the amount of organic carbon extracted from the soil with just water. This carbon source is what is used by the soil microbes and reflects the quality of the soil.

**Water-extractable organic Nitrogen:**
This result is a measurement of the amount of nitrogen that can be extracted by water but does not include inorganic nitrogen sources such as ammonia or nitrate. Like extractable organic carbon, the organic nitrogen is easily broken down by microbes to inorganic nitrogen forms that can be used by plants.

*Samples must be taken at a 0-6” depth to ensure accurate test results.*
Organic Carbon: Organic Nitrogen ratio:
This is a unitless result comparing the amount of water extractable carbon to water extractable organic nitrogen (C: N ratio). The ratio is important in microbial activity in the mineralization of nitrogen and phosphorus. The optimal ratio is between 8:1 and 15:1.

Soil Health Calculation

The soil health calculation number is determined as 1-day CO2-C divided by the organic C: N ratio plus the water extractable organic carbon/100 + water extractable organic nitrogen/10. The calculation combines 5 independent soil measurements and varies from 0 to over 50. The goal is to see an increase in the number over time.

*Samples must be taken at a 0-6” depth to ensure accurate test results.*