



knowledge to grow



## What is Soil Organic Matter?

Soil is an incredibly complex substance. There are volumes of books written about the subject matter. Thankfully, soil organic matter (SOM) only makes up a small portion of what we call soil, so it alone is not as complicated to explain.

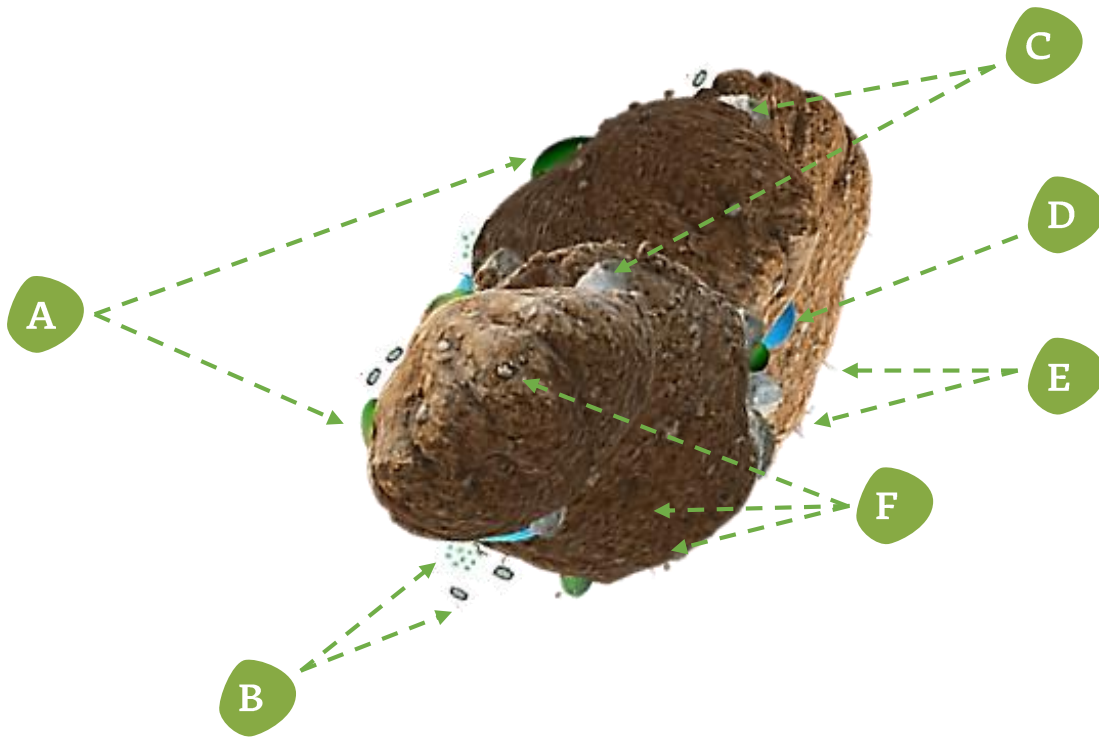
SOM is the small fraction of soil that includes plant and animal residues at various stages of decay, cells and tissues of soil organisms, and substances synthesized by living soil organisms.<sup>1,2</sup> The process of decomposition is a key characteristic of organic matter. Admittedly, decay and decomposition can be a little smelly, icky and gross at times, but from a soil science perspective decomposition is a wondrous process. For example, compost is usually made from an assorted mixture of organic matter that has decomposed; and fungi are masters at decaying organic matter and unlocking the precious nutrients from within.<sup>3</sup>

Not all SOM is the same. Often, you'll hear references to the quality of the organic matter of soil. What is being referenced is the labile, or relatively easily decomposable portion of organic matter, otherwise known technically as active organic matter.<sup>1,2</sup> Another thing you may have heard about recently is some changes related to soil humus. Organic matter and soil humus were commonly used interchangeably but the understanding of what was previously called humus has been completely...well, 'uprooted'.<sup>4</sup> Lastly, there's a misconception that soil can never have too much organic matter but there is emerging research that too much SOM can cause problems for plants by interfering with nutrient cycling processes. Despite being a small portion of soil, SOM has a large effect on almost all soil properties.<sup>2</sup> Generally, the benefits of SOM are that it stores and supplies nutrients, improves overall soil structure, enhances water infiltration and water storage capacity, supports soil biological activity, and it also buffers against pH changes in soil.<sup>2</sup>

These days it seems the most important thing about SOM is that it includes all carbon-containing materials in the soil, and so it has linkages to greenhouse gas drawdown and carbon sequestration, which is garnering a lot more attention in the media because of its connections to fighting the climate change crisis. We 'dig deeper' into soil carbon and carbon sequestration in a separate factsheet.



Where's the SOM? The image below is a drawing of a soil aggregate. Spoiler alert...it's not illustrated to scale (we can't actually see soluble nutrients) but it demonstrates that SOM is only a small portion of the overall soil composite. The SOM included below is on the surface and embedded within the aggregate.



An illustration of the major components of a typical sandy loam soil aggregate found commonly in Southern Ontario: (A) soluble nutrients; (B) diverse soil bacteria; (C) mixed minerals; (D) water and gases occupying pore spaces; (E) soil organic matter; and (F) sand, silt, and clay.

### References:

1. Gregorich, E.G., et al. (Eds.). *Soil and Environmental Science Dictionary*. Canadian Society of Soil Science. CRC Press, 2001.
2. Munroe, Jake, et al. *Soil Fertility Handbook Publication 611, 3<sup>rd</sup> Edition*. Ontario Ministry of Agriculture, Food, and Rural Affairs. Province of Ontario, 2018.
3. Lowenfels, Jeff. *Teaming With Fungi*. Timber Press. 2017.
4. Weil, Ray R., and Brady, Nyle C. *The Nature and Properties of Soils, Fifteenth Edition*. Pearson Education, 2017