

Glossary of Terms

Active Site: the section of an enzyme that acts on the substrate to release nutrients.

Aerobic microbes: microbes that require oxygen for energy, growth, reproduction and cellular respiration.

Absorption: molecules or ions that permeate a material such as a soil particle.

Adsorption: adhesion of a molecule or ion onto the surface of a solid such as a soil particle surface.

Aggregates: a grouping of soil material that is loosely formed by chemical and biological activity. The size and distribution of aggregates contributes to soil structure and allows air and water flow within the soil.

Anaerobic Microbes: microbes that require oxygen poor environments for energy, growth, reproduction and cellular respiration.

β -glucosidase (BG): a carbon cycling enzyme responsible for the release of glucose into the soil environment.

Bioindicator: a measurable biological presence or action that can be used to indicate the soil ecosystem's status or "health".

Bulk pH: an average measurement of hydrogen ions (H^+) in soil solution.

Catalyst: presence of a substance that causes an increase in a reaction without being physically altered.

Cell Lysis: the rupture of a cell wall or membrane.

Cellulase: group of enzymes responsible for the breakdown of cellulose.

Cellulose: long-chained glucose molecules that serve as main structural components in the cell wall of plants.

Cellulosome: scaffold-like structure made up of discrete multi-enzyme complexes that protrudes from the surface of the cell wall and into the soil environment to aid in exposing enzymes to substrates.

Cofactor: an element or compound that must be present for an enzyme to function.

Complex Compounds: a broad term used to indicate a grouping of simpler substances (compounds or ions) that are connected by chemical bonds.

Enzyme: a protein catalyst created by animals, plants and soil microbiology to breakdown complex compounds into simpler molecules.

Enzyme Activity: the action of a protein catalyst on a substrate in the soil. Enzyme activity is expressed as the released product per gram of soil per hour.

Extracellular Enzymes: enzymes that exist outside the parent cell. Extracellular enzymes can refer to enzymes within the soil solution or adsorbed to the surface of organic matter, clay particles or other soil complexes. Extracellular enzyme activity is a large contributor to overall enzyme activity.

Exudate: a substance or molecule released into the rhizosphere to colonize bacteria and fungi.

Free Extracellular Enzymes: enzymes that exist outside the parent cell and within the soil solution.

Decomposition: the breakdown of a material to release nutrients into the soil.

Degradation: a breakdown of a compound into simpler forms (ions or compounds).

Denature: a permanent, physical alteration of the enzyme structure that prevents the enzyme from further acting on any substrates.

Dissolution: dissolving a soil solid.

Functional Diversity: a term used to describe a community based on the variety of biological processes, traits or characteristics of a particular ecosystem.

Glucose: a simple sugar that acts as an easy source of energy for soil microbes.

Immobilize Enzyme: an enzyme that is attached to an inert, insoluble material.

Intracellular Enzymes: enzymes that are created and reside within the microbial cell.

Inorganic Fertilizers: a chemical that releases plant available forms of nutrients quickly (e.g. ammonium nitrate).

Microbes: a broad term used to reference soil microorganisms such as bacteria, fungi and actinomycetes that require a microscope to see.

Microsite: a small section of soil that often contains ideal environmental conditions and rich resources such as nutrients, water, temperature, and pH for microbial proliferation. These areas are often contained in the rhizosphere around roots, within plant residues or on aggregate surfaces.

Microsite pH: localized site in the soil, such as on the surface of a soil particle or organic matter, where high chemical or biological activity has caused a change in pH. This pH often differs from bulk pH.

Mineralization: the conversion of inorganic forms of nutrients to organic forms of nutrients through microbial action.

Organic Fertilizers: sources of soil nutrients that originate from animal matter, manure and vegetation (e.g. applying manure to a field).

Organic Amendments: material added to the soil that originates from plants or animals.

Phosphatase: a group of enzymes that are responsible for the cycling of organic phosphates.

Phosphodiesterase (PHD): a soil enzyme responsible for the degradation of nucleic acids, phospholipids and other diesters which constitute a main component of fresh organic P inputs in soil.

Phosphodiesters: bonds that link deoxyribose to phosphorus and make up the backbone of nucleic acid.

Residue: undegraded material that has been left in a field (e.g. corn stalks).

Soil Colloid: smallest particles of the soil system that represents the most active portion of soil that help determine the physical and chemical properties of the soil (e.g. clay particles, humus material).

Soil Management Practices: a broad term to describe any anthropogenic impacts or actions on the soil.

Soil Microbial Community: a broad term used to refer to the diverse grouping of soil bacteria, actinomycetes, fungi, algae and protozoa that interact in a soil ecosystem and their impacts on soil properties.

Synthetic Fertilizers: See inorganic fertilizers.

Substrate: a compound in the soil acted upon by an enzyme to release specific products.

Urea: a nitrogen containing compound that is the end product of the breakdown of protein metabolism. It is often used in synthetic fertilizers as a form of nitrogen.

Urease (UR): an enzyme responsible for converting urea into ammonium carbonate, a compound that readily degrades to ammonia (NH_3) and carbon dioxide (CO_2).