ENZYMES IN AGRICULTURE

elemental enzymes®

Enzymes are proteins produced by all living organisms and act as a catalyst for chemical reactions. Enzymes play a role in many biochemical processes in the soil including:

- Nitrogen fixation and conversion
- Conversion of soil organic matter to release bio-available nutrients
- Carbon cycling
- Pesticide degradation

Where do enzymes in soil come from?

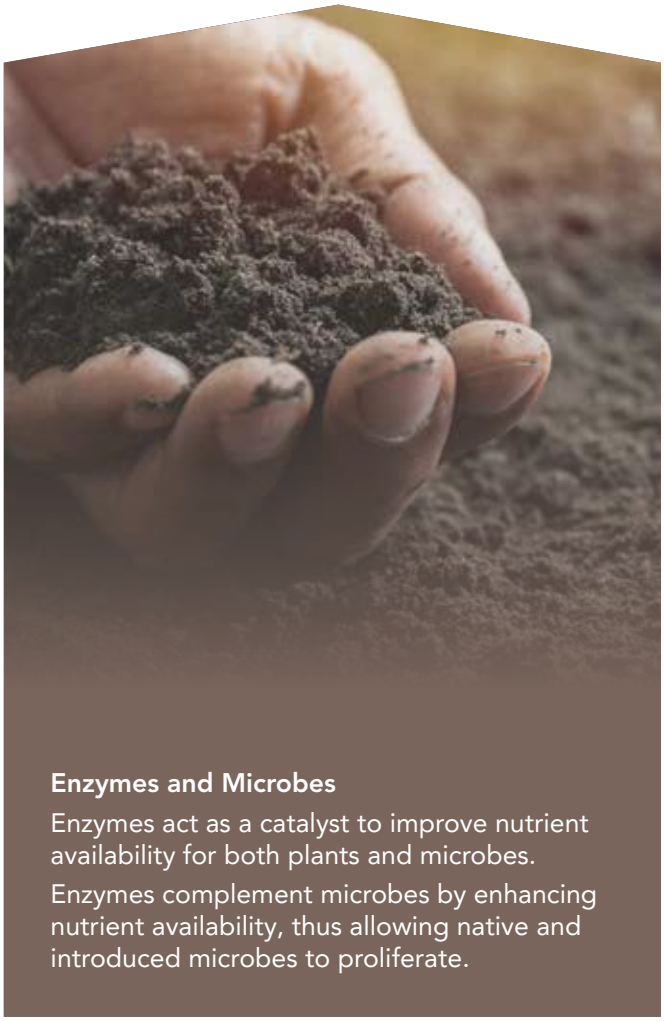
Enzymes are ubiquitously produced by all organisms in the soil. The majority of enzymes naturally found in soil are from bacteria or fungi. Plants synthesise enzymes as well and secrete several of them into the rhizosphere surrounding the roots and root hairs to aid in nutrient acquisition.

Enzymes in agriculture

Applying additional stabilised enzymes directly to the soil enhances the natural conversion processes of complex biological molecules, accelerating the release of plant available nutrients.

Advantages of enzymes

- Disperse quickly through the soil rhizosphere
- Survive at low soil moisture
- Function at wide pH range (5-10)
- Begin catalysing pursued reactions as soon as they are applied to the soil
- Catalyse numerous reactions for days or even weeks
- Compatible with many fertilisers
- Consistent crop nutrition performance and benefits for multiple plant species



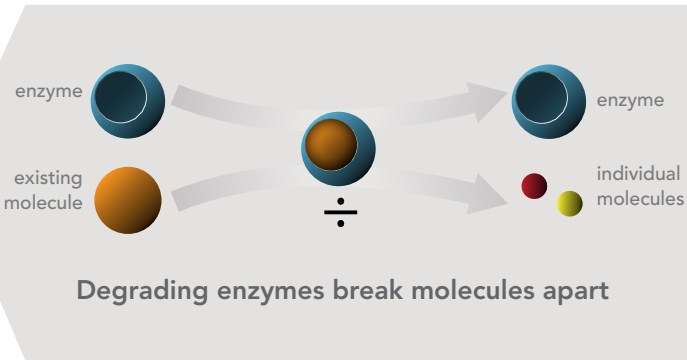
Enzymes and Microbes

Enzymes act as a catalyst to improve nutrient availability for both plants and microbes.

Enzymes complement microbes by enhancing nutrient availability, thus allowing native and introduced microbes to proliferate.

How do soil enzymes work?

Enzymes act as catalysers of chemical reactions and each enzyme is usually only able to catalyse one distinct reaction for a narrow range of substrates.



Degrading enzymes break molecules apart

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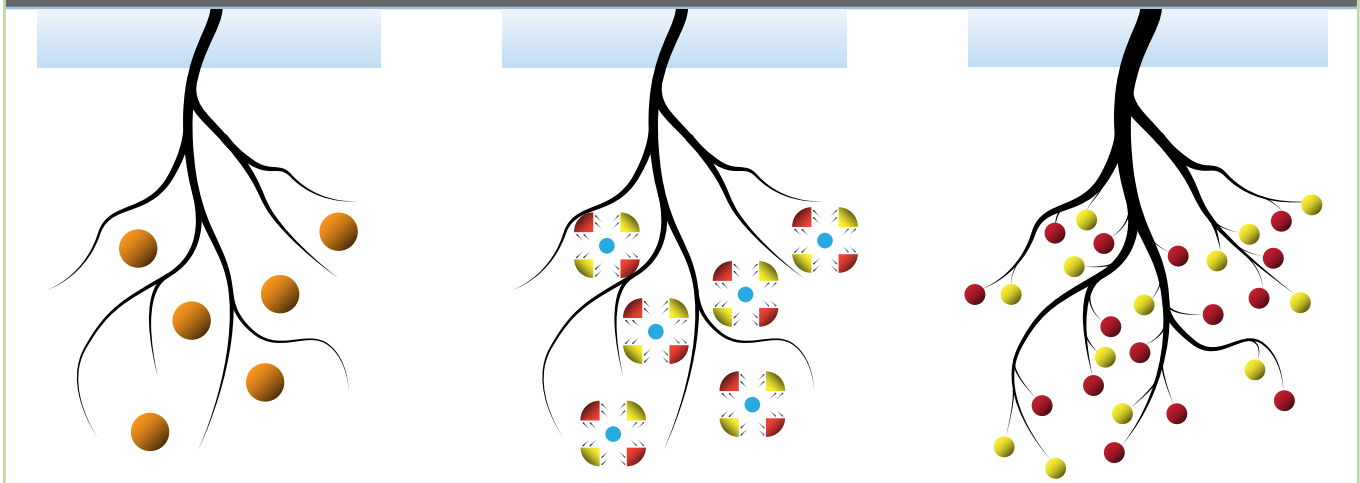
Priming the soil



1 Nutrients bound in organic residue unavailable for plants and beneficial soil microbes

2 Degrading enzymes catalyze transformation of bulky organic molecules into smaller compounds

3 Enzyme products serve as bio-available nutrients for plants and beneficial soil microbes

Priming the soil from the beginning

Soil enzymes are applied with fertiliser at planting and begin catalysing reactions immediately and continuously near the seed. For a number of weeks, they catalyze their specific chemical reactions on complex organic soil-borne molecules and release bio-available nutrients important for growth. As a result, the seed germinates into a nutrient-enriched soil environment resulting in better seed emergence and seedling establishment.

There are numerous enzymes that can be used in various agricultural situations. Elemental Enzymes has patented many of these enzymes to be used to improve nutrient efficiency in cropping systems.

Enzymes are ideal for all cropping preparation and planting and have a great fit for:

- Unlocking soil-borne nutrients
- Improving efficiency and return on applied fertilisers
- Aiding in stubble breakdown in minimum and zero tillage
- Enhancing overall soil health

How are enzymes applied?

- Applied directly to the soil
- Impregnated or coated onto solid fertilisers
- As a liquid solution at planting or during side dressing
- As a seed treatment

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