



Revolutionary Enzyme Protection Process Keeps Enzymes Active in Soil Longer and Improves Efficacy

BRANDT ENZUP enzymes undergo a patent pending process that prevents the enzymes from degrading in the soil too quickly after application. This allows them to remain active longer and substantially increases enzyme efficacy. This is an entirely new technology and scientific breakthrough for agriculture.

The Importance Of Enzymes and How They **Function In Crops**

- Enzymes are non-living proteins made by plants, microbes or other organisms in the soil proteins.
- Enzyme activity is an indicator of healthy soils.
- Enzymes act as catalysts that perform very specific functions and create chemical reactions in the soil. Typically, enzymes either cleave something apart or pull something together. Enzymes impact:
 - Organic matter breakdown
 - Nitrogen fixation and conversion
 - Nutrient availability and uptake
 - Pesticide degradation

The Difference Between Enzyme and **Microbial Products**

Microbial products contain live microbes. To survive in the soil, microbes require nutrients, optimal pH, salt and organic matter - which causes them to have a high death rate, especially during harvest and tilling. It takes months to build up microbe levels in the soil.

In contrast, enzymes are non-living organisms, which makes them more stable in the soil. When they are applied to the soil, they are immediately active and perform consistently across all soil types.

Key Benefits of BRANDT EnzUp



Improved plant health, improved nutrient and water uptake



Improved stress tolerance



Improved quality and vield



Enhanced plant response to applied fertilizers - increased hushels

UP TO 15% YIELD INCREASE

Source: BRANDT Field Trials 2016-2018

Stable chemistry



Immediately active in the



100-1200X more enzymes



Consistent performance across all soil



BRANDT EnzUp Enzymes

Microbes



Live organism



Takes time to build up microbe numbers in the soil



Have a high death rate



Require optimal pH and soil conditions to survive



Enzymes: Boost Nutrient Availability and Uptake



Get More from Your Fertilizer Investment

This new technology contains a high concentration of enzymes that boost nutrient availability and converts organic matter into smaller, digestible units. Which creates a rich soil environment for the seed.

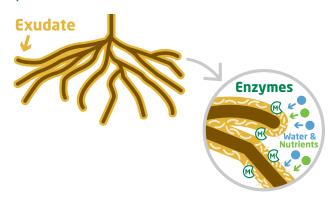
Key Benefits

- More water and nutrient uptake
- Increased plant response to fertilizer applications
- Gets plants off to a strong start
- Increased microbial activity
- Larger, healthier root systems
- Improved stress and drought tolerance
- Increased yield



M

Mannanase enzyme - its primary function is to break down starches in the exudate that surrounds the outermost layer of the root tips. This chemical reaction creates a draw of water and nutrients to the root zone and releases sugars to the plant. This in turn boosts root growth and increases microbial activity.



Lipase enzyme - its primary function is to break down lipids in root exudates and organic residue in the soil allowing for better water flow and nutrient uptake by the roots.

Bio-Available Nutrients

Enzymes

Organic Residue



Zinc and Enzyme Interaction

All enzymes need a co-factor for activation. For Lipase and Mannanase enzymes, zinc is that co-factor. The zinc ignites enzyme activity, which allows the enzymes to perform their chemical reactions faster and more effectively. The boost in enzyme activity increases total water and nutrient uptake.



% Organic Matter	Soil Organic Matter (Ibs/acre/ft) approx	P ₂ O ₅ tied up as Organic P (lbs/acre/ft of soil) approx
0.5	17,150	230
1.0	34,290	460
1.5	51,440	690
2.0	68,590	910
2.5	85,740	1,140
3.0	102,890	1,370
(Doran 2012)		



BRANDT EnzUp Formulations



Dry Soluble Formulations

BRANDT EnzUp K DS

5-0-49 8.0% S

Derived from potassium nitrate, potassium sulfate and muriate of potash

P 3.5 x 10² µUnits/g

M 1.5 x 10⁶ μUnits/g

BRANDT EnzUp P DS

12-58-0

Derived from monoammonium phosphate

P 5.0 x 10² μUnits/g

M 2.2 x 10⁶ μUnits/g

BRANDT EnzUp S DS

21-0-0 23.0% S

Derived from ammonium sulfate and urea

P 5.0 x 10² μUnits/g

M 2.2 x 10⁶ μUnits/g

Liquid Formulations

BRANDT EnzUp Mn

3.0% Mn

Derived from manganese EDTA

(L) 2.0 x 10³ µUnits/mL

M 1.0 x 10⁶ µUnits/mL

BRANDT EnzUp Zn

4.0% Zn

Derived from zinc EDTA

2.0 x 10³ µUnits/mL

M 1.0 x 10⁶ μUnits/mL

M Mannanase enzyme

(L) Lipase enzyme

P Phosphatase enzyme

Liquid Formulation Field Trials

Corn NC, 2017 (bu/ac) 1 (633,9 kg	0.1 Advantage			
10-34-0 + BRANDT ENZUP ZN	219.9 (13,802,6 kg/ha)			
10-34-0	209.8 (13168.64 kg/ha)			
12.0 Advar (753,2 kg/ha)	ntage			
10-34-0 + BRANDT ENZUP ZN 146 (9164,1 kg/ha)				
10-34-0 134	(8410,9 kg/ha)			
IL, 2018 (bu/ac)	9.0 Advantage (564,9 kg/ha)			
5-12-0 4S + BRANDT ENZUP ZN	(18390,9 kg/ha) 293			
Control	(17826,0 kg/ha) 284			
NE, 2018 (bu/ac)	18.2 Advantage (1142,0 kg/ha)			
9-24-3 + BRANDT ENZUP ZN	(17041,4 kg/ha) 271.5			
9-24-3	(15899,0 kg/ha) 253.3			
Cotton VA, 2018 (lb/ac) 2x2 application	173.4 Advantage (194,4 kg/ha)			
11-37-0 + BRANDT ENZUP ZN	(1674,2 kg/ha) 1493.7			
11-37-0	(1479,9 kg/ha) 1320.3			
Lettuce CA, 2019 (lb) mean carton weight	5.8 Advantage (2.6 kg)			
GS + BRANDT ENZUP ZN	(12,0 kg) 26.5			
Grower Standard	(9,4 kg) 20.7			
Potatoes ID, 2018 (cwt/ac)	48 Advantage (5380,1 kg/ha)			
10-34-0 + BRANDT ENZUP ZN	(48420,8 kg/ha) 432			
10-34-0 + 9% ZN EDTA	(43 040,7 kg/ha) 384			
ID, 2018 (cwt/ac)	39 Advantage (4371,3 kg/ha)			
10-34-0 + BRANDT ENZUP ZN	(49765,8 kg/ha) 444			
10-34-0 + 9% ZN EDTA	(45394,5 kg/ha) 405			

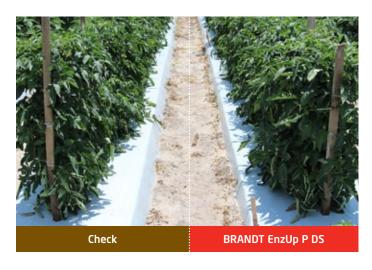


These products may only be sold in states where registered or where registration is not required. For further information, please contact your BRANDT representative.

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Dry Soluble Formulation Field Trials

Cantaloupe NC, 2017 (lbs/ac)	927.1 Advanta(ge
BRANDT ENZUP P DS	(29489,5 kg/ha) 2630 9	0.9
Check	(28450,3 kg/ha) 25382. 8	3
AZ, 2019 (# boxes per acre)	108.6 Advantage	
BRANDT ENZUP P DS + 9% Z	n 4	75.3
Grower Standard + 9% Zn	366.7	
Cucumber GA, 2017 (lbs/ac)	4648.8 Advan	tage
BRANDT ENZUP P DS	:	7835.8
Check	(59614,7 kg/ha) 5318	7.0
Pepper NC, 2017 (lbs/ac)	5775.5 Advantage (6473,5 kg/ha)	
BRANDT ENZUP P DS	(50745,1 kg/ha) 452	73.7
Check	(44272,2 kg/ha) 39498.2	
Tomato NC, 2017 (lbs/ac)	2534.5 (2840,8 kg/ha)	Advantage
BRANDT ENZUP P DS	(65776,7 kg/ha)	58684.6
Check	(62935,9 kg/ha)	56150.1
FL, 2017 (lbs/ac)	3637.4 Advanta	age
BRANDT ENZUP P DS	(37912,7 kg/ha)	33824.9
Check	(33835,7 kg/ha) 30187	.5
Almonds CA, 2018, Nut Meat Yield (lbs/ac)	220.0 Advanta _{	ge
BRANDT ENZUP P DS	(3104,8 kg/ha) 27 7	70
Control	(2858,2 kg/ha) 2550	
Wine Grapes CA, 2018, Mean Bunch Weight (Ib	0.04 Adv.	antage
BRANDT ENZUP P DS	(0,27 kg)	0.59
MAD	(0.35 kg)	_



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