30TH EDITION

VITAZYME

VITAZYME® an All Natural Concentrate

2025 Field Tests Results

A SUMMARY OF EXPERIMENTS USING VITAZYME SOIL, SEED, & PLANT TREATMENT ON FIELD, ORCHARD, & GREENHOUSE CROPS

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VitalEarth RESOURCES

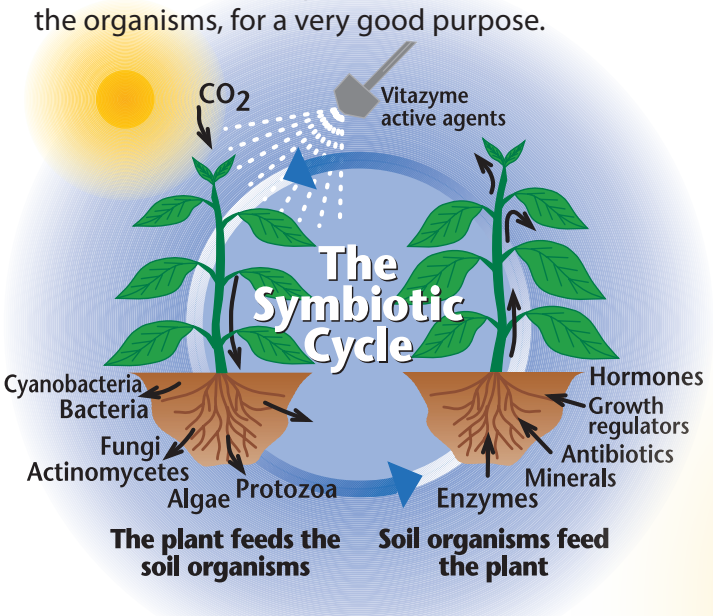
Introduction *How Vitazyme works within the plant-soil system.*

This is the thirtieth edition of Vitazyme crop reports, documenting research results from around the world on the successful use of this versatile biostimulant for all soils and climates.

For those unfamiliar with Vitazyme soil and plant biostimulant and its recommended program, please review the information given below to understand how the material works within the plant-soil system.

Improved Symbiosis: The Secret of Vitazyme's Action

All plants that grow in soils develop an intimate relationship between the roots and the organisms that populate the root zone. The teeming billions of bacteria, fungi, algae, cyanobacteria, protozoa, and other organisms that grow along the root surfaces— the rhizosphere—are much more plentiful than in the bulk of the soil. This is because roots feed the organisms with dead root epidermal cells as well as compounds exuded from the roots themselves. The plant may inject 25% or more of its energy, fixed in the leaves as carbohydrates, amino acids, and other compounds, into the root zone to feed the organisms, for a very good purpose.



The microorganisms which feed on these exuded carbon compounds along the root surfaces benefit the plant in many ways, creating a beautiful symbiotic relationship. The plant feeds the bacteria, fungi, algae, and other microbial species in the rhizosphere, which in turn secrete enzymes, organic acids, antibiotics, growth regulators, hormones, and other substances which are absorbed by the roots and transported to the leaves. The acids help dissolve essential minerals, and reduced iron releases anionic elements. Organism types include mycorrhizae, cyanobacteria and various other bacteria, fungi, and actinomycetes.

Vitazyme contains "metabolic triggers" that stimulate the plant to photosynthesize more efficiently, fixing more sunlight energy in the form of carbon compounds to increase the transfer of carbohydrates, proteins, and other growth substances into the root zone. These active agents may enter the plant through either the leaves or the roots. Root growth and exudation are both enhanced. This enhancement activates the metabolism of the teeming population of rhizosphere organisms to a higher level, triggering a greater synthesis of growth-benefiting compounds and a faster release of minerals for plant uptake. Thus, the plant-microbial symbiosis is stimulated.

Very small amounts of these metabolic triggers in Vitazyme are needed to greatly improve plant and rhizosphere microbe response. This is because of the **enzyme cascade effect**. Successive tiers of enzymes are activated in plant and microbial tissues to give a large physiological response from very little activator.

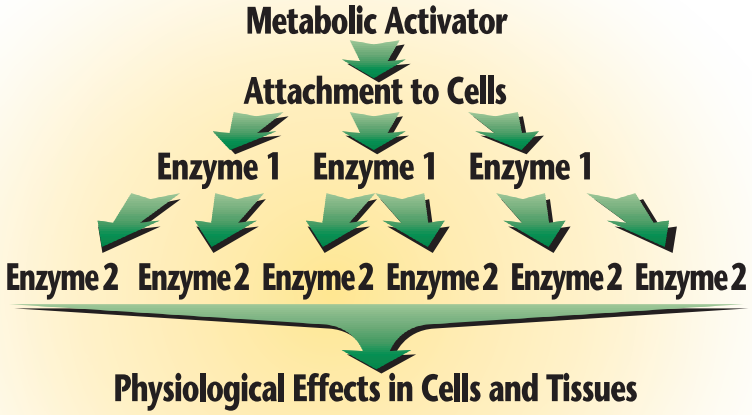
Nitrogen Fertilizer Reduction Guide with Vitazyme

Obtain a score for each of these four items

Soil Organic Matter			Previous Crop		Compaction		Soil NO_3-N Test		
Low (<1.5%)	Medium (1.5-3%)	High (>3%)	Non-legume	Legume	Much	Little	Low	Medium	High
1	2	3	1	3	1	3	2	4	6

Add the scores above to find the N-reduction

Total score	15	14	13	12	11	10	9	8	7	6	5
% of optimum N to apply	← 50-60% →				← 60-70% →				← 70-80% →		



In short, Vitazyme enables the plant to better express its genetic potential by reducing the stresses that repress that expression.

Vitazyme may be used for crop production at any degree of technology, from animal power and low inputs to GPS-guided tractor power and high fertility inputs. Please consult the Vitazyme User's Guide for details.

General use for field crops with less than optimal fertilization levels, when soil testing is not possible:

1. Apply normal levels of organic and commercial fertilizers.
2. Treat the seeds, transplant roots, or seed pieces whenever possible at planting. To treat seeds, typically use 250 ml/ha in the minimum water for good seed coverage. Mixing 1 liter/ton of seeds is also very effective. Dip roots or transplants in a 0.5 to 1% solution, or spray with a 5% solution.
3. Apply Vitazyme to the soil and/or leaves according to recommendations. In most cases use 1 to 1.5 liters/ha per application, from one to three times during the growing season.

General use for field crops with optimal fertilization and soil testing:

1. Test the soil at a reputable laboratory, and obtain expert fertilization recommendations.
2. Fertilizer nitrogen rates may be lowered somewhat, depending on soil conditions; refer to the table above.
3. Treat the seeds using a seed treater to achieve about 1 liter/ton of seed of actual product, or apply 1 liter/ha in-furrow at planting, with or without starter fertilizer.
4. Apply Vitazyme to the soil and/or leaves according to recommendations.

Remember that Vitazyme is a complement to other sound, sustainable crop management practices. Incorporate crop rotations, minimal tillage, erosion control, and adapted plant varieties whenever possible.

Vitazyme Highlights *Continued Proof of Excellent Crop Responses Worldwide.*

Vitazyme Highlights for 2025

The year 2025 was a very good one for revealing the excellent and consistent responses of many crop species to the Vitazyme program. These results continue the superb responses of this crop biostimulant noted every year since research work began in 1995.

1. **Vegetable crops — California.** Research trials performed by e-Cultiver at the USDA Plant Gene Expression Center, Albany, California, showed the potential of the program in greenhouse and field trials to increase yields of beans, beets, carrots, pumpkins, kale, tomatoes, onions, turnips, spinach, and peppers by up to 31%.
2. **Peppers — California.** Holden Research and Consulting in a replicated pepper trial, using Vitazyme alone as well as Vitazyme plus a silicon product, revealed excellent improvements in plant vigor for these two treatments, plus increases in marketable yield of 19 to 35%. The silicon additive showed an excellent synergism with Vitazyme.
3. **Corn — South Dakota.** A replicated fertilizer nitrogen rate study at South Dakota State University, Brookings, continued the excellent yield responses with reduced nitrogen that have been noted on Vitazyme with corn for several years. With irrigated corn, seed and foliar applications at zero and 80 lb/acre of nitrogen resulted in grain yield increases of 6% and 5%, respectively compared to the untreated nitrogen levels.
4. **Hazelnuts — Chile.** Orchard-scale replicated trials in Chile produced excellent responses to Vitazyme foliar applications. In one trial, the yield enhancement was 10%, while a competitor product increased yield by only 1%. Another trial saw an increased number of fallen nuts at a specific date in the harvest season, an economically beneficial effect.
5. **Alfalfa — California**. The University of California Extension Service conducted a trial with Vitazyme on newly planted alfalfa to measure its effects on forage quality. The results showed highly beneficial effects on crude protein (+1.79%) and a number of nutritional measures such as ADF (+1.91%), NDF (+2.61%), fat (+0.10%), lignin (-0.49%), energy (+0.022 Mcal/lb), TDN (+1.6), and RFV (+15.9).
6. **Winter wheat — Ukraine.** In spite of the war in Ukraine, farm-scale research trials were conducted on winter wheat in a number of areas of the country. The results were uniformly excellent, as they have been for many years, in terms of yield and grain quality. Yields were improved by up to 14%, in most cases using only a seed treatment, but also on the leaves and soil in one trial where the program helped the crop withstand the stress effects of unusually cold temperatures. The content of protein and gluten were also improved.
7. **Potatoes — Germany.** The Agro Nord-Kurzinger GbR Testing Center for Potato Research evaluated the effect of Vitazyme as a seed piece treatment along with three foliar/soil applications. The results were excellent in terms of significantly greater stem per plant (19%), tubers per plant (+ 49%), tuber starch content (+0.8 percentage point), and tuber yield (+11%).

Alfalfa *with Vitazyme application*

Researcher: Michael Rethwisch
Research organization: Palo Verde Valley Vegetables, University of California Cooperative Extension, University of California Agriculture and Natural Resources, Riverside, California
Location: Palo Verde, California
Planting date: mid-January 2023
Variety: unknown; newly planted
Soil type: unknown
Experimental design: A newly-planted alfalfa field received a Vitazyme application on part of the acreage, with the rest of the field left untreated. The purpose of the trial was to evaluate the effect of the biostimulant on alfalfa quality.

1 *Control* 2 *Vitazyme*

Fertilization: unknown
Vitazyme application: 20 oz/acre (1.5 liters/ha) on January 14, 2023, shortly after planting
Alfalfa quality results: The sampling was performed in replicated fashion on March 30, and analyzed at a quality testing laboratory.

Treatment	90% dry matter basis						10% dry matter basis	
	Crude protein	ADF[1]	NDF[2]	Fat	Lignin	Energy	TDN[3]	RFV[4]
	%	%	%	%	%	Mcal/Lb		
Control	17.29	29.90	36.31	1.37	6.89	0.583	57.4	145.5
Vitazyme	18.99	27.99	33.70	1.47	6.40	0.605	59.0	161.4
P–value	0.057	0.1448	0.0975	0.0826	0.1144	0.1386	0.1436	0.1249

[1]ADF = Acid Detergent Fiber; [2]NDF = Neutral Detergent Fiber; [3]TDN = Total Digestible nutrients; [4]RFV = Relative Feed Value.
All of these values for Vitazyme are significant at F = 0.15 or less, with crude protein nearly significant at P = 0.05, and NDF and Fat significant at P = 0.10.

Improvement in alfalfa feeding quality with Vitazyme

Crude protein ..... 1.79 percentage-points
*ADF..... 1.91 percentage-points**
*NDF ..... 2.61 percentage-points**
FAT ..... 0.10 percentage-point
*Lignin ..... 0.49 percentage-point**
Energy ..... 0.022 Mcal/Lb
TDN 1.6
RFV..... 15.9

*These are negative values for Vitazyme, which is favorable for feeding because they show feed components that are not digestible.

Conclusions: This alfalfa study in Southern California, using 20 oz/acre (1.5 liters/ha), applied shortly after planting, showed that Vitazyme improved all of the eight feeding parameters examined, especially crude protein, which increased by 1.79 percentage points. All changes with Vitazyme were significant at P = 0.15 or less. Feeding energy was increased as were the digestible nutrients and feed value, at the same time that undigestible contents, such as lignin and cellulose, were reduced. These results show that Vitazyme will improve the feeding value of alfalfa in several ways.

Apples *with Vitazyme application*

Researcher: Tye Wittenbach ***Research organization:*** LTI Ag Research, Kent City, Michigan
Field location: Kent City, Michigan ***Variety:*** Wildfire gala ***Rootstock:*** M9-337
Tree density: 11 ft between rows, 3 ft in-row ***Soil type:*** unknown
Experimental design: An apple orchard in west-central Michigan was utilized to determine the effect of Vitazyme on apple yield and quality when applied in addition to the grower standard. Four replications in a randomized complete block design were arranged, with five trees per plot (20 total trees per treatment) and at least one guard tree on each side to isolate plots from spray drift.
Fertilization: Ground applied fertilizer was applied three times with a Kuhn MDS 8.2 Spreader with a banding kit: (1) April 1 (300 lb/acre of Blend 2); (2) May 28 (300 lb/acre of Tropicote calcium nitrate); (3) June 16 (300 lb/acre of Blend 5). Blend 2 contained 6-6-16% of N-$P_2 0_5$-$K_2 0$ plus Mg, Mn, Zn Fe, Cu, S, Ca, and B. Blend 5 contained 2-8-8% of N-$P_2 0_5$-$K_2 0$ plus Mg Zn, S, and Ca. Other nutrients were applied along with foliar sprays.

❶ ***Control*** (Grower Standard) ❷ ***Vitazyme*** (on top of Grower Standard)

Vitazyme applications: Six Vitazyme applications were made by spraying at a rate of 32 oz/acre using a Stihl SR 200 backpack sprayer at 40 gal/acre of water.

(1) Pink (April 30)
(2) Petal fall (May 12)
(3) First cover (June 16)
(4) Second cover (June 30)
(5) Third cover (July 14)
(6) Fourth cover (July 22)

Fungicide, bactericide, and insecticide applications: A series of chemicals was applied by orchard sprayer to all areas, beginning with dormancy and continuing to 4th cover. The sprays totaled 14 in all, and included Captan, Orbus, Axios, Gattan, Esteem, Avaunt, Proclaim, and others.
Grower standard applications: All applications utilized a Precise EXP7-8 orchard sprayer.
Fruit quality results: Twenty-five fruit were collected on August 26 from each plot to evaluate quality parameters. Pressure was measured on both the sun-side and the non-sun-sides.

Brix. No significant differences between the two treatment at P=0.10.
Fruit pressure. No significant differences between the two treatment at P=0.10.
Starch. No significant differences between the two treatment at P=0.10.

Fruit yield results: The fruit number was counted for each plot, and the yield weighed, on August 6.

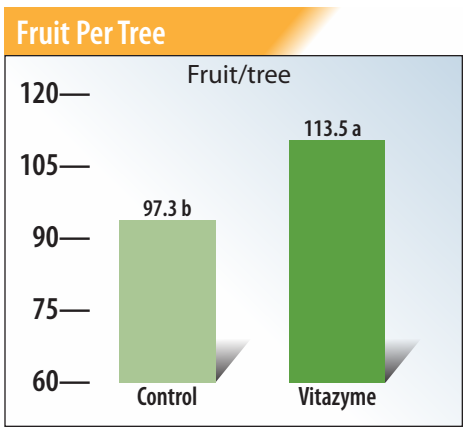
Treatment	Fruit/Tree,[1] average	Number change
	number	number
1. Control	97.3 b	—
2. Vitazyme	113.5 a	16.2 (+17%)

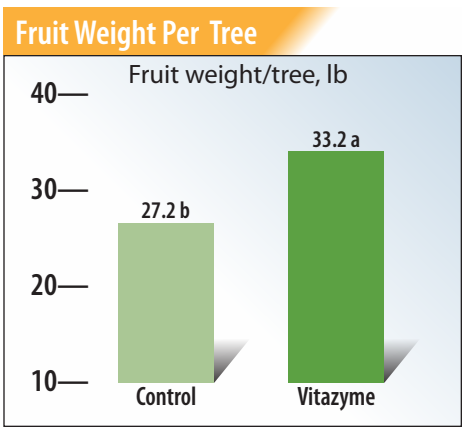
[1]Means followed by the same letter are not significantly different at P = 0.10 according to ANOVA.

Treatment	Fruit weight/Tree,[1] average	Number change
	lb	lb
1. Control	27.2 b	—
2. Vitazyme	33.2 a	6.0 (+22%)

[1]Means followed by the same letter are not significantly different at P = 0.10 according to ANOVA.

Increase in fruit number/tree with Vitazyme: 17%





Increase in fruit weight/tree with Vitazyme: 22%

Conclusions: An apple trial in west-central Michigan evaluated the effect of Vitazyme biostimulant, applied upon the grower standard applications, on fruit quality, size, and yield. Six 32 oz/acre applications were made, from pink through fourth cover. No significant differences were detected in fruit Brix, pressure, or starch, but fruit number/tree was significantly increased (17%) and fruit yield as well (22%). The higher yield than number indicated a higher average fruit weight with Vitazyme. The six 32 oz/acre applications were likely in excess of the usually recommended applications of 20 oz/acre per applications. These results demonstrate the great effectiveness of Vitazyme for apple production in western Michigan.

Vitazyme Field Tests for 2025

Bush Beans *with Vitazyme application*

Researcher: Rajnish Khanna, Ph.D. ***Research organization:*** i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California ***Variety:*** *Phaseolus vulgaris*
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 5-gallon pots, to compare the effects of Vitazyme on plant growth versus untreated controls. Three pots were used for each treatment.

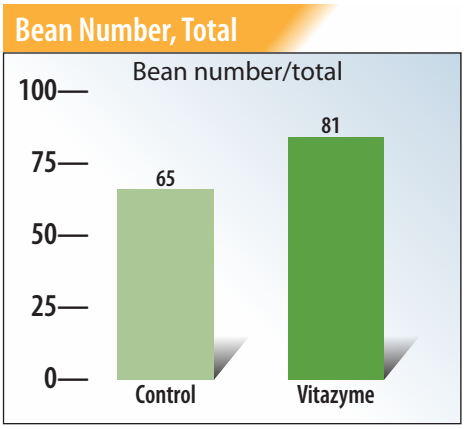
1 *Control* 2 *Vitazyme*

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants

Conclusions: This greenhouse pot trial with beans, using Vitazyme every 14 days, showed that the total bean number increased by 25%, or 5.3 beans per plant. These results show the excellent effect of Vitazyme to increase the productivity of bush beans.

Yield results: The number of bean pods for each plant was counted, totaled, and statistically analyzed.

Increase in total bean number with Vitazyme: 16 (+25%)



Vitazyme Field Tests for 2025

Beets *with Vitazyme application*

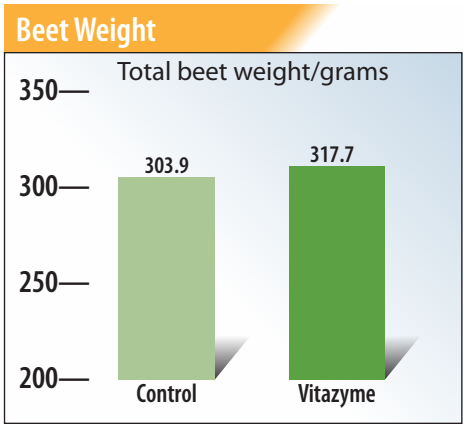
Researcher: Rajnish Khanna, Ph.D. ***Research organization:*** i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California ***Variety:*** unknown
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 3-gallon pots, to compare the effects of Vitazyme on root weight compared with untreated controls. Five pots were used for each treatment.

1 *Control* 2 *Vitazyme*

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants

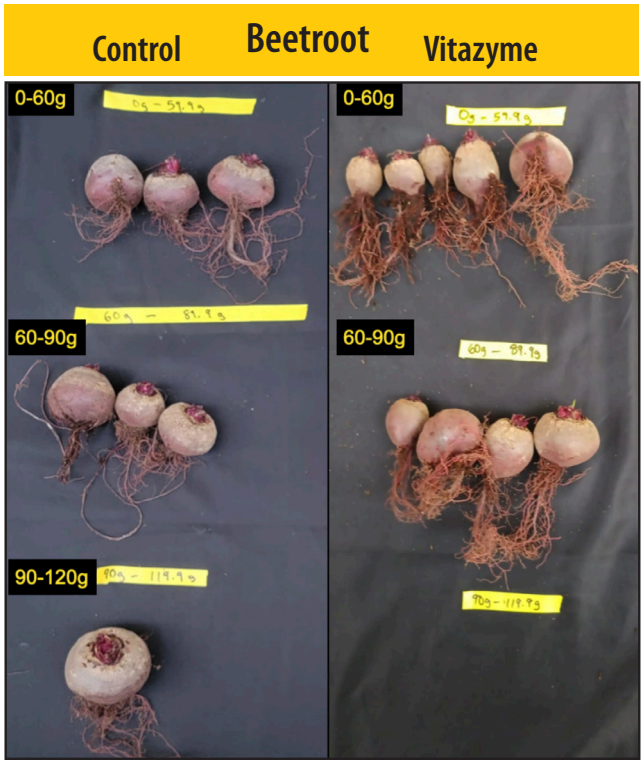
Yield results: The roots in each pot were weighed, and totaled.

Increase in beet root with Vitazyme: 13.8 g (+5%)



Conclusions: This greenhouse pot trial with beets, using Vitazyme every 14 days, showed that the fresh weight of the roots was increased by 5%, or 2.8 grams per plant.

As for all root crops, Vitazyme improved the yield of the beet crop in this California trial.



Canola (winter) *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: Farm "Persei Agro," Koniushky Village, Ivano-Frankivsk District, Ivan-Frankivsk Region, Ukraine.
Previous crop: winter barley
Variety: DK Exited
Planting date: August 24, 2024
Seeding rate: 0.45 million seeds/ha
Tillage: disking to 6-8 cm, subsoiling to 25 cm, cultivation to 2-3 cm
Soil type: leached chernozem, (3.2% organic matter)
Experimental design: A commercial-scale winter canola field was divided into an untreated control area and a Vitazyme treated area, for the purpose of evaluating the effect of Vitazyme on the yield of canola seeds.

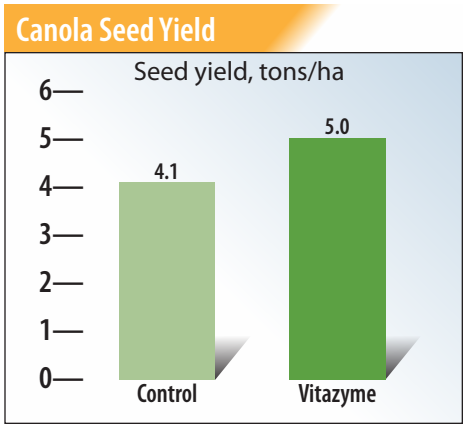
❶ *Control* ❷ *Vitazyme*

Fertilization: 5-0-20 kg/ha of N-P_2O_5-K_2O applied in-furrow at planting on August 24, 2024, plus 200 kg/ha of N and 24 K/ha of S top-dressed in the spring
Vitazyme application: a split foliar/soil application of Vitazyme: 0.6 liter/ha (8 oz/acre) on April 25, 2025, at bud formation (BBCH 55), and 0.4 liter/ha (5 oz/acre) at the green pod stage (BBCH 78) on June 14, 2025

Yield results:

Increase in canola seed yield with Vitazyme: 22%

Treatment	Seed yield	Yield change
	tons/ha	tons/ha
1. Control	4.1	—
2. Vitazyme	5.0	0.9 (+22%)



Income results: The extra 0.9 ton/ha of canola seed returned the farmer $463/ha extra income.

Conclusions: A winter canola farm-scale trial in Ukraine, comparing a Vitazyme treated portion of the field with an untreated control — all other agronomic practices being the same for both areas — revealed that a split application of the product produced a 0.9 ton/ha yield increase, which represented a 22% improvement above the untreated control. Treatments were at bud formation (BBCH 55) and the green pod (BBCH 78) stages. These results, along with a $463/acre increase in income, reveal the great utility of this program to supplement farmers' canola programs in Ukraine.

Carrots *with Vitazyme application*

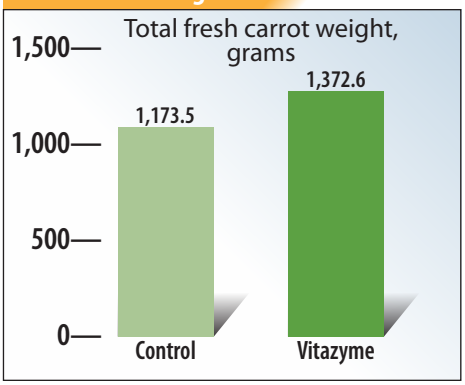
Researcher: Rajnish Khanna, Ph.D.
Research organization: i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California
Variety: unknown
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 6-gallon pots, to compare the effects of Vitazyme on root weight compared with untreated controls. Ten pots were used for each treatment.

❶ ***Control*** ❷ ***Vitazyme***

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants
Yield results: The mature roots in each pot were weighed, and values totaled.

Increase in carrot root weight with Vitazyme: 199.1g (+ 17%)

Carrot Root Weight



Conclusions: This greenhouse pot trial with carrots, using Vitazyme every 14 days, showed that the fresh weight of the carrots was increased by 17%, or 19.9 grams per plant. These results show the excellent effect of Vitazyme to increase the productivity of carrots.

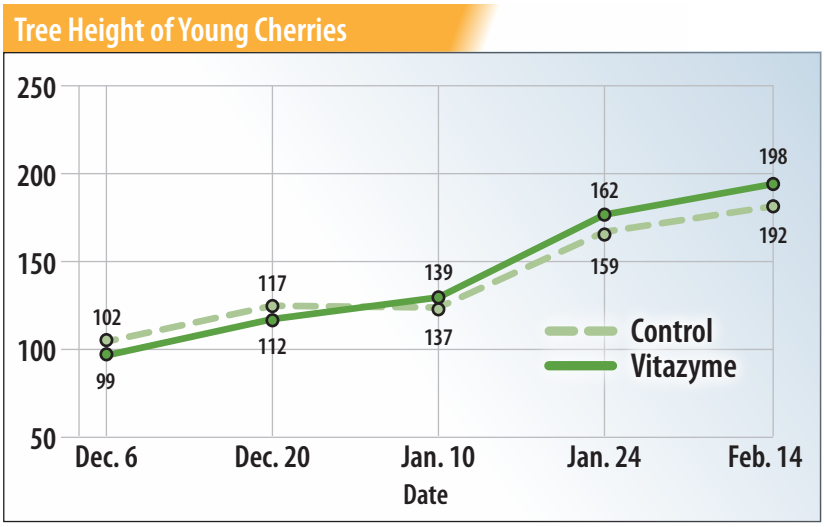
Cherries *with Vitazyme application*

Researcher: Thomas Stowhas, M.S, Sebastian Navarro, and Nicolas Miranda
Research organization: Centro Ceres, Chile, NG Aserorias, Chile, and Plant Designs, Rochester, New York, respectively
Location: Agricola La Esperanza, central Chile
Watering: drip irrigation
Soil type and analysis: Note the data outlined later.
Experimental design: A commercial cherry orchard was planted in October of 2024, with one parcel showing delayed vegetative growth compared to an adjoining parcel. To assist tree development in the delayed parcel, it was decided to apply Vitazyme through the drip system with the hope of improving tree growth as determined by tree height. Soil differences between the two parcels were also evaluated.

❶ *Control* ❷ *Vitazyme*

Vitazyme applications: Two applications of Vitazyme were make, at the beginning and end of January, 2025, via Fertigation at a.0 liter/ of Vitazyme across the delayed vegetation parcel. Since the parcel was 1.6 ha, the rate was 0.63 liter/ha each application.
Tree height results: Tree heights were measured at five dates.

Date	Tree height, cm		Height change with Vitazyme, cm
	Parcel 1 (Control)	Parcel 2 (Vitazyme)	
Dec. 6, 2024	102	99	-3
Dec. 20, 2024	117	112	-5
Jan. 10, 2025	137	139	+2
Jan. 24, 2025	159	162	+3
Feb 14, 2025	192	198	+6



Exposing the soil profile of treated and untreated areas of the cherry orchard revealed improved rooting for the Vitazyme treated area.

This young cherry orchard served as the location of a Vitazyme trial for investigating the possible enhancement of cherry tree growth in Central Chile.

The height was greater with the Vitzyme treatment as time progressed, once treatment effects began after the early January application.

Chemical soil indicator results: Soil evaluations were carried out by Thomas Stowhas at the Soil Research Line of Centro Ceres on April 23, 2025.

Physical soil indicator results: Bulk density was determined for the two treatments.

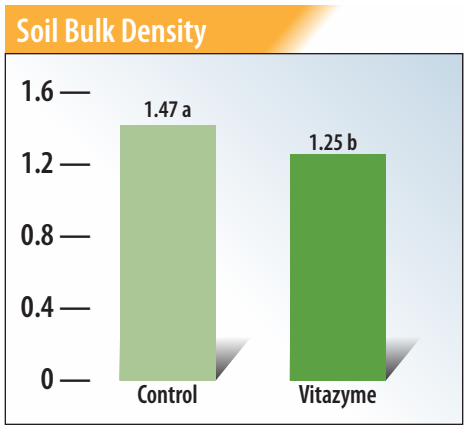
Treatment	Bulk density[1]	Density change
	g/cm³	g/cm³
1. Control	1.47 a	—
2. Vitazyme	1.25 b	- 0.22

[1]Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA

Decrease in density with Vitazyme: 0.22 percentage points

Parameter	Control	Vitazyme	Change	Interpretation
pH	5.5	5.7	+ 0.2	Slightly more alkaline
EC (dS/m)	1.0	0.9	- 0.2	Marginal salinity, decrease
Organic matter (%)	2.2	1.9	- 0.3	Minor difference
N (ppm)	21.6	14.4	- 7.2	Lower N availability[1]
P (ppm)	41.8	42.4	+ 0.6	Slight increase
K (ppm)	91.4	81.3	- 10.1	Small decrease

[1]A reduction likely due to N-immobilization from increased microbial activity. There were no significant chemical changes in the soil after Vitazyme application; all values remained within optimal levels for cherry production.



Vitazyme treated soil showed a highly significant reduction in bulk density, causing improved water and air relationships.

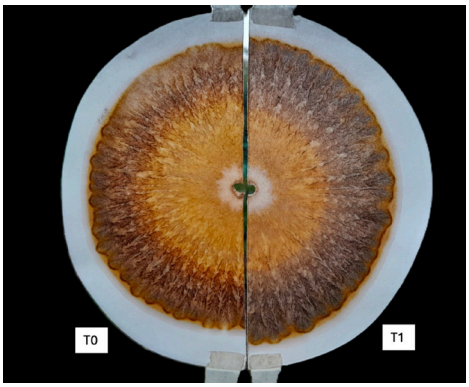
Biological soil indicator results: Circular paper chromatography of the soil from the two treatments revealed clearer color transitions and more complex, balanced biological ring patterns with Vitazyme treated soil These differences indicate improved aeration, stronger mineral-organic integration, and more active microbial communities.

Zone	Control	Vitazyme	Interpretation
Aeration	Cream ring, slight compaction	Light cream, no compaction	Improved structure and oxygen movement
Mineral	Brown-yellow, poor integration	Smooth yellow-brown integrative	Better nutrient mobility
Organic matter	Fibrous texture	Smooth transitions	Balanced, well-humified organic matter
Biological edge	Dark border, regular	Specled, "lunar" spots	High enzymatic and microbial activity

Humification Index (E4/E6)			
Treatment	A472	A664	E4/E6*
1. Control	0.213	0.012	17.8
2. Vitazyme	0.257	0.026	9.9

*Obtained by dividing A472 by A664.

The E4/E6 index decreased from 17.8 to 9.9 with Vitazyme, indicating a shift towards more mature aromatic acids and accelerated organic matter transformation.



This soil chromatography trial showed that Vitazyme improved the aeration, mineral availability, organic matter, and microbial status of the soil.

Conclusions: The combined field and soil evaluations demonstrate that Vitazyme improved the biological functionality of the rhizospheric soil as well as the vegetative performance of these young cherry trees. While chemical parameters remained stable, the physical and biological properties were improved: lower bulk density, better mineral-organic integration, and enhanced microbial activity. These improvements coincided with visual improvements in plant growth as the Vitazyme-treated trees surpassed the control trees in height. These improvements support the increased vigor and more dynamic root-soil interactions that contribute to sustainable cherry orchard establishment.

Corn *with Vitazyme application*

Researcher: Brennan Lewis
Research organization: Department of Agronomy, Horticulture, and Plant Science, South Dakota State University, Brookings, South Dakota
Location: South Dakota State University Research Farm, Aurora, South Dakota
Variety: Dekalb DKC 47-85R1B
Plant population: 35,000 seeds/acre
Planting date: May 9, 2025
Row spacing: 30 inches
Soil type: Brandt silty clay loam
Previous crop: soybeans
Experimental design: A small-plot, irrigated, randomized, replicated (RCBD with four replicates) corn trial was established on the Aurora experimental farm, using plots that were 30 x 10 feet. The objective of the trial was to evaluate the effect of Vitazyme on the yield of corn at three nitrogen levels as compared to untreated corn at each level.

Treatment	Nitrogen	Vitazyme application	
		On seeds	Foliar at V6
	lb/acre N		oz/acre
1.	0	0	0
2.	0	X	13
3.	80	0	0
4.	80	X	13
5.	120	0	0
6.	120	X	13

Fertilization: See the rates of N in the table. Urea was applied on June 10 at 174 lb/acre for the 80 lb/acre of N, and 260 lb/acre for the 120 lb/acre of N. Anvol Urease Inhibitor was added to the urea to slow N release.
Vitazyme application: See the table for applications. The seed treatment was accomplished by mixing 6 oz of Vitazyme in a bag of seed. The foliar sprays were performed using a sprayer at the V6 stage on July 10.
Irrigation: one irrigation on July 31 to supply 1.0 inch of water
Harvest date: October 15, 2025. The middle two rows were harvested for 20 feet to evaluate yield.

Improvements in root growth were especially noted in the no nitrogen plots in this South Dakota trial, where the treated corn yielded 6% more than the control.

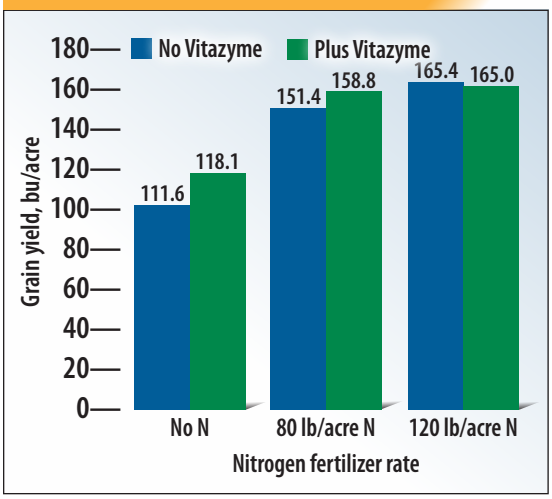
Irrigated corn treated with Vitazyme produced larger and better filled ears than the untreated plants in this South Dakota trial.

Yield results:

Treatment	Grain Yield[1]	Yield change[2]
	bu/acre	bu/acre
1. No N	111.6 c	—
2. No N +Vitazyme	118.1 bc	6.5 (+6%)
3. 80 lb/acre N	151.4 abc	—
4. 80 lb/acre N +Vita	158.8 ab	7.4 (+5%)
5. 120 lb/acre N	165.4 a	—
6. 120 lb/acre N +Vita	165.0 a	-0.4 (0%)

[1]Means followed by the same letter are not significantly different according to the Tukey Post Hoc Test at P = 0.05. Plot variability was considerable so that significant differences appear only between the 0 and 120 lb/acre N rates.
[2]Comparisons are made within the same N level

Corn Grain Yield



Corn grain yield increase with reduced nitrogen fertilizer

No N.....6%
80 lb/acre N.....5%

Conclusions: A small-plot, replicated corn trial in east-central south Dakota, using a seed and foliar (at V6) Vitazyme program at three fertilizer nitrogen levels compared to untreated control nitrogen levels, revealed grain yield increases of 6% for no added N, and 5% for 80 lb/acre N. There was no yield change at the 120 lb/acre N rate. Although significant yield changes were not detected due to considerable plot variability, the trend was for sizable grain increases at the 0 and 80 lb/acre N rates. There was no increase at the 120 lb/acre N rate, which conforms with previous studies that have shown yield increases at reduced N rates but not at high fertilizer N rates.

Vitazyme Field Tests for 2025

Corn *with Vitazyme application—A Fertility Rate and Silicon Additive Study*

Researcher: Lance Taylor
Research organization: Crossroads Ag Research, Denver, Iowa
Field Location: Denver, Bremer County, Iowa
Variety: LG Seed 55C32 STX PRO
Planting date: May 6, 2025
Planting depth: 2 inches ***Row spacing:*** 30 inches
Seeding rate: 35,000 seeds/acre
Tillage: conventional
Soil type: Clyde silty clay loam
Fertility level: good ***Soil drainage:*** excellent
Soil analysis: pH = 6.5, organic matter = 4.4%, cation exchange capacity = 21.2 meq/100 g, Bray P1 = 25 ppm, Bray P2 = 53 ppm, K = 133 ppm, Mg = 569 ppm, Ca = 2908 ppm (at 6 inches, Midwest Labs)
Experimental design: A small-plot corn trial, with plots being 15 x 30 feet (6 rows/plot, the center 2 harvested), using four replications in a randomized complete block design, was established to evaluate the effect of Vitazyme on the yield of corn over two fertility rates, with and without a silicon-based adjuvant.

❶ *Control* ❷ *Vitazyme* ❸ *Vitazyme + Nano Yield*

Fertilization: 100% = 55 gal/acre 32-0-0, 150 lb/acre diammonium phosphate, and150 lb/acre KCl (0-0-60); 60% = 33 gal/acre 32-0-0, 90 lb/acre diammonium phosphate, and 90 lb/acre KCl (0-0-60)
Vitazyme application: 13 oz/acre (1 liter/ha) in-furrow at planting; 13 oz/acre (1 liter/ha) foliar sprayed at V6 on June 18

The Crossroads Research corn trial showed that the silicon product added to Vitazyme significantly increased the grain yield at the 100% fertilizer level.

Treatment	Vitazyme	Fertilizer		Nano Yield
		100%	60%	
1. Control, 100% fert	o	x	o	o
2. Control, 60% fert	o	o	x	o
3. Vitazyme, 100% fert	x	x	o	o
4. Vitazyme, 60% fert	x	o	x	o
5. Vita + Nano, 100% fert	x	x	o	x
6. Vita + Nano, 60% fert	x	o	x	x

Vitazyme + Nano Yield application: 13 oz/acre (1 liter/ha) mixed with 1 oz/acre (0.08 liter/ha) of Nano Yield; 13 oz/acre (1 liter/ha) mixed with 1 oz/acre (0.08 liter/ha) of Nano Yield. Nano Yield is a silicic acid and aluminum sodium salt designed to improve the uptake of active agents by the plant.

Herbicide applications: May 18 – Corvus and Atrazine; June 11 – Callisto, Outlook, Atrazine, and Fultech C.C.; July 1- Status, Round Up, and AMS.

Growing season weather: average precipitation and temperature

Harvest date: October 11, 2025

Leaf chlorophyll results: No significant differences in leaf chlorophyll were detected among the six treatments at V8.

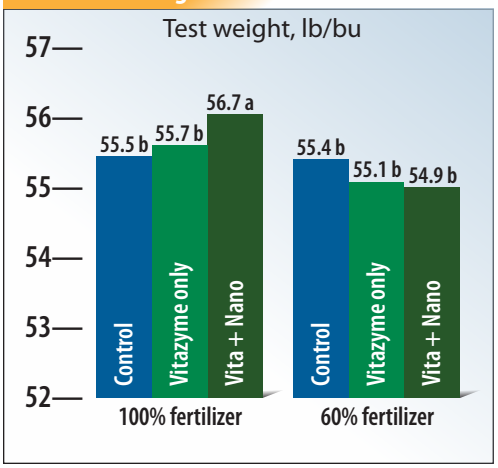
Grain Moisture content: No significant differences in grain moisture were detected among the six treatments.

Grain test weight results:

Treatment	Grain yield[1]	Yield change[2]
	lb/bu	lb/bu
1. Control, 100% fert	55.5 b	—
2. Control, 60% fert	55.4 b	—
3. Vitazyme, 100% fert	55.7 b	+ 0.2
4. Vitazyme, 60% fert	55.1 b	- 0.4
5. Vitazyme + Nano100% fert	56.7 a	+ 1.2
6. Vitazyme + Nano 60% fert	54.9 b	- 0.5

[1]Means followed by the same letter are not significantly different at P = 0.15 according to the Student-Newman-Keuls Test.
[2]Comparisons are made with the same fertilizer level.

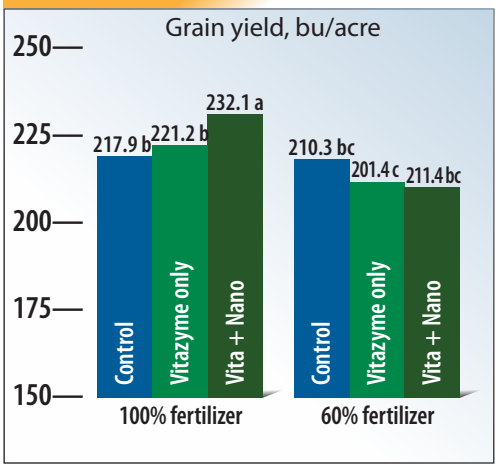
Grain Test Weight



Vitazyme coupled with Nano Yield significantly increased test weight above all five of the other treatments.

Grain Yield results: All yields are adjusted to 15.5 % grain moisture.

Corn Grain Yield



Treatment	Grain yield[1]	Yield change[2]
	bu/acre	bu/acre
1. Control, 100% fert	217.9 b	—
2. Control, 60% fert	210.3 bc	—
3. Vitazyme, 100% fert	221.2 b	+ 3.3(+2)
4. Vitazyme, 60% fert	201.4 c	- 8.9(-4%)
5. Vitazyme + Nano100% fert	232.1 a	+14.2(+7%)
6. Vitazyme + Nano 60% fert	211.4 c	+1.1(+1%)
LSD (P=0.15)	10.5	—
CV	4.55	—
Replicate probability (F)	0.1328	—
Treatment probability (F)	0.0097	—

[1]Means followed by the same letter are not significantly different at P = 0.15 according to the Student-Newman-Keuls Test.
[2]Comparisons are made with the same fertility level.

Fertilizer effects		
Three treatment at this level	Yield	
	Average	Change
	bu/acre	
100% fertilizer	223.7	16.0 (+ 8%)
60% fertilizer	207.7	—

Nano Yield effects		
Treatment	Yield	
	Average	Change
	bu/acre	
Control	214.1	—
Vitazyme alone	211.3	-2.8
Vita + Nano	221.8	+7.7 (+4%)

At the reduced fertilizer rate, sample ears reveal a progression of ear weight with Vitazyme, and then with Vitazyme plus the added silicon product.

Conclusions: In this east-central Iowa small-plot corn study, Vitazyme at 13 oz/acre (1 liter/ha) in-furrow at planting and the same rate at V6 produced a modest yield increase with the 100% fertilizer rate of 3.3 bu/acre. For some unknown reason the yield with Vitazyme decreased compared to the untreated control at the 60% fertilizer rate. However, when a 1 oz/acre (0.08 liter/ha) Nano Yield addition was made to the Vitazyme, the grain yield was boosted significantly above the control and Vitazyme only at the 100% fertilizer level; at the 60% fertilizer level the grain yield was raised slightly. These results indicate that the Nano Yield adjuvant is aiding in the movement of Vitazyme's active agents (brassinosteroids, 1-triacontanol, and B-vitamins) into the corn plants to produce higher grain yield, and also greater test weight for the 100% fertilizer rate. These results point towards the considerable utility of adding Nano Yield to Vitazyme applications for corn production in the Upper Midwest.

Corn *with Vitazyme application—A Silicon Additive Study*

Researcher: Jonathan Jaschen
Research organization:
Heritage Ag Research, Fairbank, Iowa
Location: Klinger, Iowa
Variety: PO5737PCE
Previous crop: soybeans
Planting date: May 16, 2025
Row width: 30 inches
Planting depth: 2.5 inches
Planting rate: 34,000 seeds/acre
Tillage: conventional
Soil type: Kilnger silty clay loam
Soil analysis:
pH = 5.9, organic matter = 4.0%
Experimental design: A small-plot corn trial was established in east-central Iowa, utilizing plots that were 10x 40 feet, with four rows per plot and five replications in a randomized complete block design. The purpose of the trial was to evaluate the effectiveness of Vitazyme, with and without a silica-based adjuvant, on the yield of corn grain.

❶ ***Control*** ❷ ***Vitazyme***
❸ ***Vitazyme + Nano Yield***

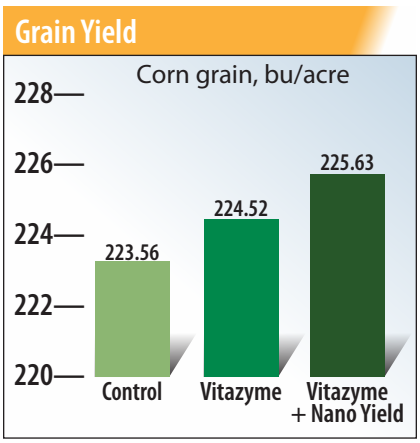
Fertilization: Before planting, triple super phosphate at 145 lb/acre, MOP at 218 lb/acre, and gypsum at 125 lb/acre; at V1, side-dress of urea ammonium nitrate (32% N) at 50 lb/acre of N; at V7, Y-drop of urea ammonium nitrate at 130 lb/acre of N
Vitazyme application: 13 oz/acre (1 liter/ha) in-furrow at planting on May 16; 13 oz/acre (1 liter/ha) foliar sprayed at V5 on July 21

There is a progression in this photo of ear size and fill from the untreated control to the Vitazyme treated, and then the Vitazyme + Si treated corn.

Nano Yield application: 1 oz/acre (0.08 liter/ha) mixed with Vitazyme for each of the two applications of Treatment 3, on May 16 and July 21. Nano Yield is a silicic acid and aluminum sodium salt designed to improve the uptake of active agents by the plant.
Growing season weather: very favorable in terms of temperature and precipitation, record yields for the area
Harvest date: October 13, 2025
Moisture content results: No significant differences in grain moisture content were detected. The range was 17.4 to 17.6%.
Grain test weight results: There were no significant differences in grain test weight for the three treatments. The range was 57.48 to 57.64 lb/bu.
Grain yield results:

Treatment	Grain Yield[1]	Yield change
	bu/acre	bu/acre
1. Control	223.56 a	—
2. Vitazyme	224.52 a	0.96 (+0.4%)
3. Vitazyme + Nano	225.63 a	2.07 (+1%)

[1]Means followed by the same letter are not significantly different at P = 0.10 according to the Student-Newman-Keuls Test.
LSD (0.10) = 5.07 bu/acre
CV = 1.92.



Plant health results: A drone was used to evaluate leaf chlorophyll, leaf N levels, and plant health during the growth period.

Treatment	Value[1]
	NDRE
1. Control	4.552 b
2. Vitazyme	4.574 ab
3. Vitazyme + Nano	4.611 a

[1]Means followed by the same letter are not significantly different at P = 0.10 according to the Student-Newman-Keuls Test.
LSD (0.10) = 0.043
CV = 0.8

NDRE Results to Access Plant Health, Chlorophyll Content, and Nitrogen Levels (November 11)

At this late stage of development, the Vitazyme + Nano Yield treatment showed superior plant health, chlorophyll, and leaf N levels as compared to the untreated control.

Notice the best root system with the Vitazyme + Si treatment on the right; there are more total roots and more root hairs that cause more soil to remain on the root balls.

Conclusions: This small-plot corn trial in east-central Iowa, which evaluated the effect of Vitazyme and Nano Yield adjuvant on corn grain yield, showed small yield benefits of up to 2.07 bu/acre for the Vitazyme + Nano Yield treatment. Vitzyme alone produced about a 1 bu/acre increase. These increases were not significant, but showed a trend of yield improvement for the two products, especially when combined. The very favorable low-stress growing conditions and high soil fertility (especially N) reduced the usual effectiveness of Vitazyme, since it performs best under stressful conditions. However, the small increases in yield show a positive trend even under maximum yield potential with optimal rain, temperature, and soil fertility in a record year of crop yields.

Hazelnut *with Vitazyme application*

Researchers: Javier Gaete, Sebastian Navarro, and Nicolas Miranda.
Research organization: I D Fruit, NG Asesorias, Chile, and Plant Designs, Rochester, New York, respectively
Farm cooperator: Agricola Forrahue, Chile
Trial location: Osorno, Chile
Variety: Yamhill (*Corylus avellana)*
Planting date: 2017
Planting density: 5 x 2.5 meters (800 trees/ha)
Soil type: volcanic ash (Andisol)
Experimental design: A hazelnut orchard was selected to evaluate the effect of Vitazyme biostimulant on the fruit set, productivity, nut weight, kernel yield, and empty nuts of the crop as compared to the grower's standard program and a commercial competitor product. A seaweed product was added to both biostimulant treatments. Five replicates were used with one tree as an experimental unit. These trees were selected for homogenicity by measuring the cross-sectional trunk area at 50 cm above ground level (ASTT = $C^2/4$ pi).

Hazelnut trees were selected for uniformity, these photos showing sectors 1 (left) and 2 (right).

The trees were marked for assessment of fruit set, as can been seen by this example.

❶ ***Control (Stimplex + Kelpak)***
❷ ***Stimplex + Brasstec***
❸ ***Stimplex + Vitazyme***

Fertilization: unknown

Product application:

Treatment	Product	Application rate	Application method	Phenological stage	Date of application
1	Stimplex, Kelpak	2 liters/ha, 1% of spray	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024
2	Stimplex, Brasstec	2 liters/ha, 3 liters/ha	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024
3	Stimplex, Vitazyme	2 liters/ha, 2 liters/ha	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024

Stimplex. A liquid formulation of *Ascophyllum nodosum* kelp that claims to improve plant growth and modulate the production of plant hormones and activate metabolic pathways to increase stress tolerance, root growth, and nutrient uptake.
Kelpak. A liquid formulation of *Ecklonia maxima* kelp that claims to influence plant cell and tissue development by influencing hormonal action to improve root growth, leaf growth, seed germination and development, and crop yields.

Brasstec. A plant biostimulant containing *Ascophyllum nodosum* kelp, brassinosteroids, and various elements, carbohydrates, and amino acids.

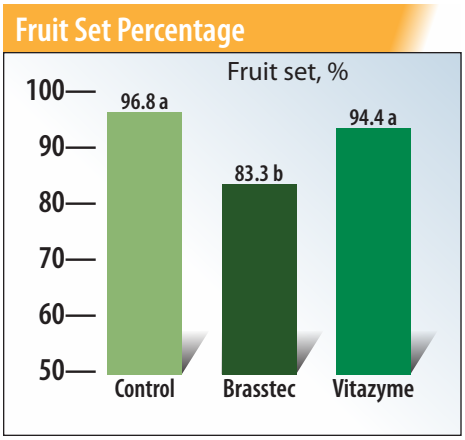
Vigor results: There were no significant differences in tree vigor before product applications, the ASTT (cm^2) values ranging from 58.5 cm^2 for the Brasstec treatment to 61.5 cm^2 for the control.

Fruit set results: Evaluations were made on December 19, 2024.

Treatment	Fruit set[1]	Fruit set change
	%	%
1. Control	96.8 a	—
2. Brasstec	83.3 b	-13.5
3. Vitazyme	94.4 a	-2.4

[1]Means followed by the same letter are not significantly different according to ANOVA; treatment P = 0.048, LSD = 10.72%.

Improvement in fruit set with Vitazyme compared to Brasstec: 11.1 percentage points

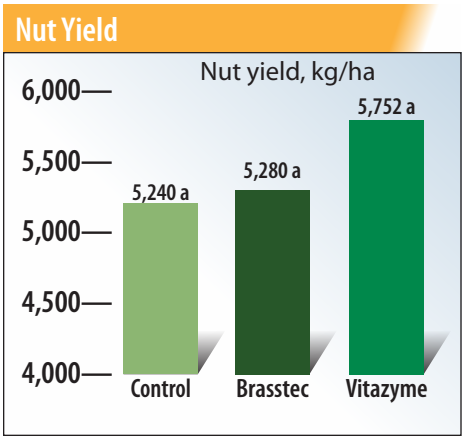


Productivity results: Nut yield was adjusted to 6% moisture.

Treatment	Nut yield[1]	Per hectare yield	Yield change
	kg/tree	kg/ha	kg/ha
1. Control	6.55 a	5,240 a	—
2. Brasstec	6.60 a	5,280 a	40 (+ 1%)
3. Vitazyme	7.19 a	5,752 a	512 (+ 10%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA, due to high plot yield variability.

Increase in nut yield with Vitazyme: 10%



Hazelnuts, showing the cross-section.

Even though the 10% nut yield increase with Vitazyme was not significant due to tree yield variability, the increase is quite large.

Productive efficiency results: This value, expressed as kg/cm^2 ASTT, though not significant revealed a value of 0.120 compared to 1.106 for the control. This improvement suggests a better conversion of structural biomass into yield for Vitazyme.

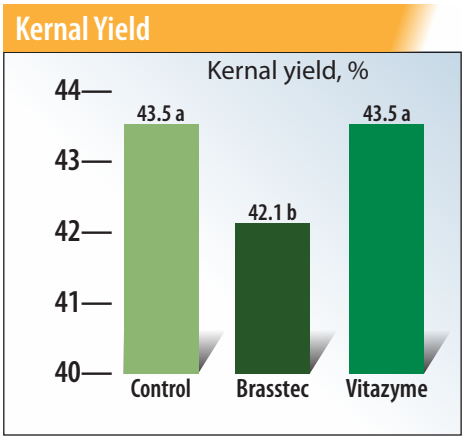
Nut weight results: The average nut weight was highest with the Vitazyme treatment — 0.84 g per nut — compared to 0.81 g per nut for both of the other treatments. These differences were not significant at P = 0.05.

Kernel yield results:

Treatment	Kernel yield[1]	Yield change
	%	%
1. Control	43.5 a	—
2. Brasstec	42.1 b	-1.4 (-3%)
3. Vitazyme	43.5 a	0

[1]Means followed by the same letter are not significantly different according to AN0VA. The Tukey P = 0.067.

Increase in kernel yield with Vitazyme compared to Brasstec: 1.4 percentage points



Empty nut results: There were no significant difference among the three treatments for empty nuts. All three were below 3%.

Conclusions: The homogeneous ASTT at trial start validates that subsequent differences are attributable to treatments rather than initial vigor. Vitazyme maintained fruit set at the level of the field program and avoided the reduction observed with Brasstec. This supports a positive effect of Vitazyme on early reproductive success (pollen tube growth, ovary cell division and retention). Although mean yield per tree did not differ statistically, Vitazyme's advantage of approximately + 500 kg/ha is agronomically meaningful at commercial scale. Productive efficiency trends corroborate better conversion of structural biomass into yield with Vitazyme. Kernel yield is a key economic driver in hazelnut. Brasstec significantly reduced kernel yield, while Vitazyme matched the field program. Empty nuts remained low and statistically similar across treatments. Overall, integrating Vitazyme within the biostimulant strategy preserved fruit set and kernel yield while improving projected yield, without detrimental effects on quality metrics.

The best overall treatment was Stimplex + Vitazyme, which gave the most consistent technical advantages across fruit set, productivity, and kernel yield. Commercial relevance: The projected yield increase with Vitazyme can materially improve gross returns at farm scale, and nut weight and kernel yield were maintained by Vitazyme in all cases.

Hazelnuts-2 *with Vitazyme application—Demonstration Trial—Nut Falling*

Researcher: Nicolas Miranda.
Research organization: Plant Designs, Rochester, New York
Location: Longavi, Maule, Chile, Agricola Pachacama Farm
Variety: European hazelnut (*Corylus avellana.*), cv. Tondadi Giffani
Planting date: 2019 ***Tree spacing:*** unknown
Soil type: unknown
Experimental design: A commercial hazelnut orchard was utilized to evaluate the effect of Vitazyme on the maturation of the nuts for the purpose of enhancing the early dropping of the nuts. Plots of six trees were selected for the treated and for the untreated treatments, without replications. The standard farm program was applied to both treatments

❶ *Control* ❷ *Vitazyme*

Fertilization: unknown
Vitazyme application: a single Vitazyme foliar spray at 1 liter/ha (13 oz/acre), using a 1,000 liter/ha spray volume, on November 29, 2024, at advanced nut filling to early maturation (BBCH 721P–722P)
Fallen nut results: Ground-fallen nuts were collected from each plot at each evaluation date and weighed; total weight per plot was recorded (g). A 100-nut subsample weight (g per 100 nuts) was recorded for some replicates as a reference for average nut weight; data were incomplete in the first collection and are considered secondary. Originally, 3-4 partial collections were planned, but the orchard was commercially harvested between the first and second evaluations; therefore, only two collections were completed.

Collection 1 was taken on March 3, 2025.
Collection 2 was taken on March 12, 2025.

This photo shows the fallen hazelnuts in the orchard of a Vitazyme study, in which the first collection of fallen nuts was increased by 15% with product application.

Treatment	Fallen nut weight, six trees[1]			
	Collection 1	Change[2]	Collection 2	Change
	kg	kg	kg	kg
1. Control	3.89 b	—	5.16 a	—
2. Vitazyme	4.47 a	0.58 (+ 15%)	5.14 a	- 0.02 (+ 0%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA, though because the trees were not randomized and replicated according to standard statistical protocols, these differences must be treated as indicative.
[2]Main cause for the weight difference: The 100-nut weights were around 330-340 g/100 nuts (Control) and near 300 g/100 (Vitazyme). This suggests the first-collection difference in total weight was driven mainly by a higher number of nuts collected, with a potentially lower moisture level affecting individual nut weight in the Vitazyme samples

Increase in fallen nuts with Vitazyme (Collection 1): 15%

Cumulative Fallen Nut Weight (two collections)

Treatment	Nut weight	Weight change
	kg	kg
1. Control	54.34	—
2. Vitazyme	57.60	3.26 (+6%)

Increase in cumulative fallen nut weight with Vitazyme: 6%

Discussion and agronomic interpretation:

(1) Early response at the first collection: The higher fallen nut weight observed on March 3 may indicate improved nut retention and/or late-season filling in the Vitazyme sector, increasing the fraction of nuts recovered earlier.

(2) Convergence by the second collection: Similar weights on March 12 suggest the control sector caught up as the season progressed, reducing the initial gap.

(3) Practical relevance: A cumulative + 6% difference in recovered fallen nuts could be economically meaningful in commercial production; however, the magnitude cannot be robustly converted to yield per hectare without full-harvest measurements.

Limitations of the study:

(1) Evaluation was based on fallen nuts, not total harvested yield per tree/row/area.

(2) The report does not describe formal randomization and blocking; treatment sectors may differ for reasons unrelated to the product.

(3) Only two partial collections were completed due to commercial harvest between dates.

(4) 100-nut weight data were incomplete in the first collection.

Hazelnuts in Chile responded well to Vitazyme in terms of both yield and fallen nuts to expedite harvest.

Conclusions: A single foliar application of Vitazyme at advanced nut filling/early maturation (November 29, 2024) was associated with +15% higher fallen nut weight per plot in the first collection (March 3, 2025). At the second collection (March 12), fallen nut weight was similar between treatments. Across both collections, Vitazyme accumulated approximately +6% fallen nut weight than the control. Given the demonstration nature and methodological constraints ,these results should be considered preliminary and justify further trials with a randomized design, more replications, and full-yield measurements, plus quality parameters (e.g., nut size, kernel percentage, and blanks).

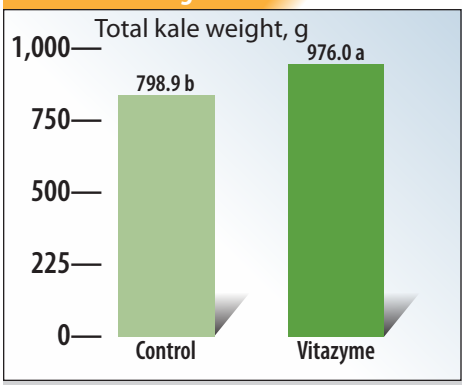
Kale *with Vitazyme application*

Researcher: Rajnish Khanna, Ph.D.
Research organization: i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California
Variety: *Brassica oleracea*
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 3-gallon pots, to compare the effects of Vitazyme on kale fresh weight compared with untreated controls. Eleven pots were used for each treatment.

1 *Control* 2 *Vitazyme*

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants
Yield results: The mature plants in each pot were weighed, and the values were statistically analyzed.

Kale Fresh Weight1



[1]Means followed by the same letter are not significantly different at P = 0.05. P = 0.029.

Increase in kale fresh weight with Vitazyme: 177.1 g (+ 22%)

Conclusions: This greenhouse pot trial with kale, using Vitazyme every 14 days, showed that the fresh weight of the kale was increased by 22%, or 16.1 grams per plant. These results show the excellent effect of Vitazyme to increase the productivity of kale.

Lettuce *with Vitazyme application*

Researcher: Matthew O. Abiola
Research organization: Federal University Oye Ekiti, Nigeria
Field location: Kern Family Farm, North Fork, California
Varieties: Romaine, crisp head, and loose leaf
Planting date: April 16, 2025
Soil type: sandy loam
Transplanting date: May 3, 2025
Tillage: conventional
Soil analysis: pH = 7.1, organic matter = low, cation exchange capacity = 10 meq/100 g, SAR = 0.63, P, Zn, M, and Fe = adequate, NO_3-N = marginal, S, and Cu = deficient

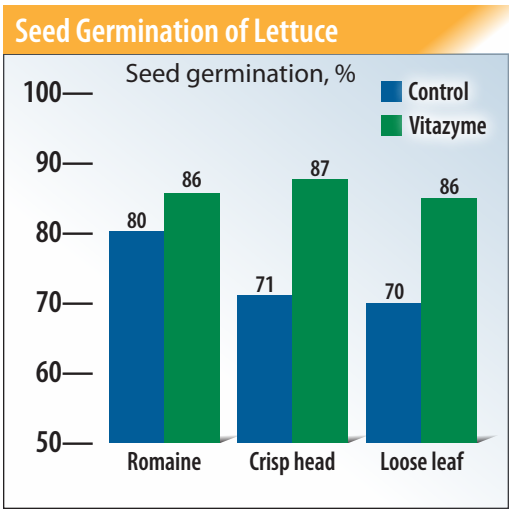
Lettuce. The lettuce plants were grown in plots that were 2x7 meters, and were drip irrigated during the dry summer months in California.

Experimental design: A small-plot lettuce study, using three lettuce varieties, was established in a completely randomized (CRD) arrangement, with 9 inches between rows and 9 inches within rows, with three replicates. A total of 36 plots were 2 x 7 meters, and seedlings were planted in 24 positions within each plot. The objective of the study was to determine the effect of Vitazyme on the growth, yield, and quality of lettuce besides stress tolerance and profitability.

1 *Control* **2 *Vitazyme***

Fertilization: none
Vitazyme applications: *Transplant treatments:* two nursery applications of a 0.1 % Vitazyme solution to approximate 13 oz/acre (1 liter/ha); *Field treatments:* two applications of a 0.1% Vitazyme solution at 13 oz/acre (1 liter/ha)

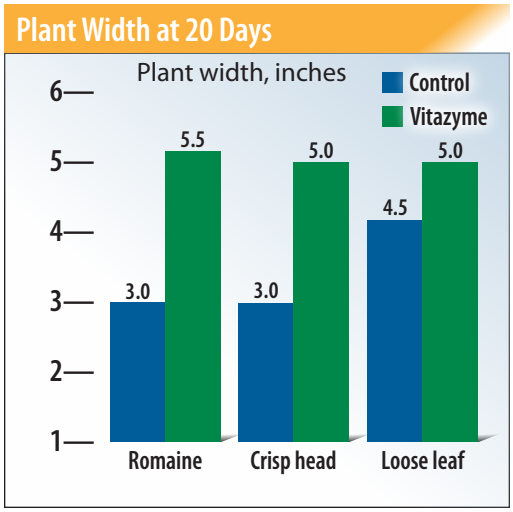
Plant emergence results:
Control emergence time (average) : 16 days
Vitazyme emergence time (average): 9 days
Seed germination results: Evaluations of the percent germination were made 14 days after planting.

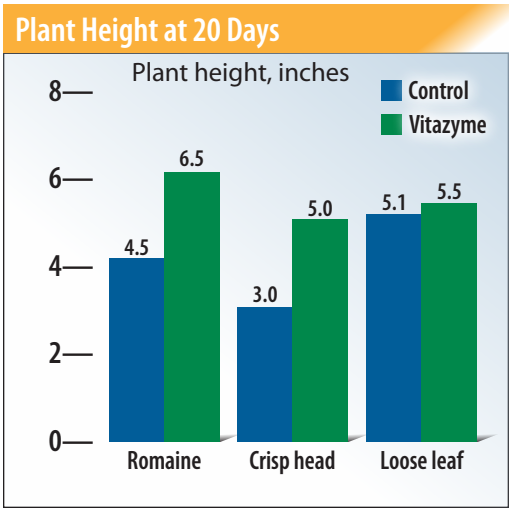


Improvement in seed germination with Vitazyme vs. the control

Romaine ..... 6 percentage points
Crisp head ..... 16 percentage points
Loose leaf ..... 16 percentage points

Plant width and height results: Measurements were made of plant width and height at 20 days after transplanting.





Plant width and height were consistently and greatly increased for all three lettuce varieties at 20 days after transplanting.

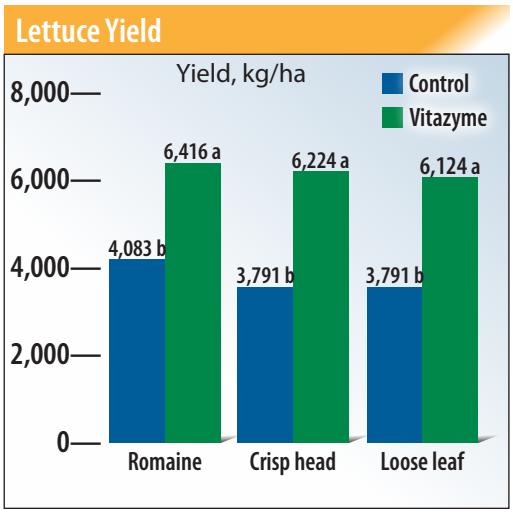
Lettuce yield results: The harvest was expressed in terms of kg/ha.

Treatment	Romaine[1]		Crisp head[1]		Loose leaf[1]	
	Total	Change	Total	Change	Total	Change
	kg/ha		kg/ha		kg/ha	
1. Control	4,083 b	—	3,791 b	—	3,791 b	—
2. Vitazyme	6,416 a	2,333 (+57%)	6,224 a	2,433 (+64%)	6,124 a	2,338 a (+62%)

[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

Yield increase with Vitazyme

Romaine 57%
Crisp head 64%
Loose leaf 62%



Lettuce yield was greatly increased by Vitazyme for all three lettuce varieties.

Nutrient content results: Samples of Vitazyme treated and control lettuce were analyzed by a laboratory to determine the elemental content.

Nutrient	Control	Vitazyme	Change with Vitazyme
PO_4— P	3,487	5,060	+ 1,573
B, ppm	22	28	+ 6
NO_3—N, ppm	6,779	6,325	- 454
Cu, ppm	5	5	0
Cl, %	2.08	3.22	+ 1.14
P, %	0.59	0.66	+ 0.07
K, %	8.62	11.38	+ 2.76
Ca, %	1.25	1.21	- 0.04

In every case except for NO_3-N and Ca, the nutrient content of the Romain lettuce was increased with Vitazyme.

The reduction in NO_3-N with Vitazyme was a favorable nutritional effect, since free nitrate in foods is not favorable for health

Water stress results: A certain number of loose leaf and crisp head lettuce plants were subjected to water stress by withholding irrigation water for 25 days. The survival rate of the lettuce plants after this induced drought was then recorded.

Variety	Survival of plants	
	Control	Vitazyme
	number	number
Romaine	6	10
Crisp head	6	9
Loose leaf	5	8

Improvement of plant survival with Vitazyme vs. the control

Romaine ..... + 67%
Crisp head ..... + 50%
Loose leaf ..... + 60%

These improvements reveal that heat and drought stress are alleviated by Vitazyme.

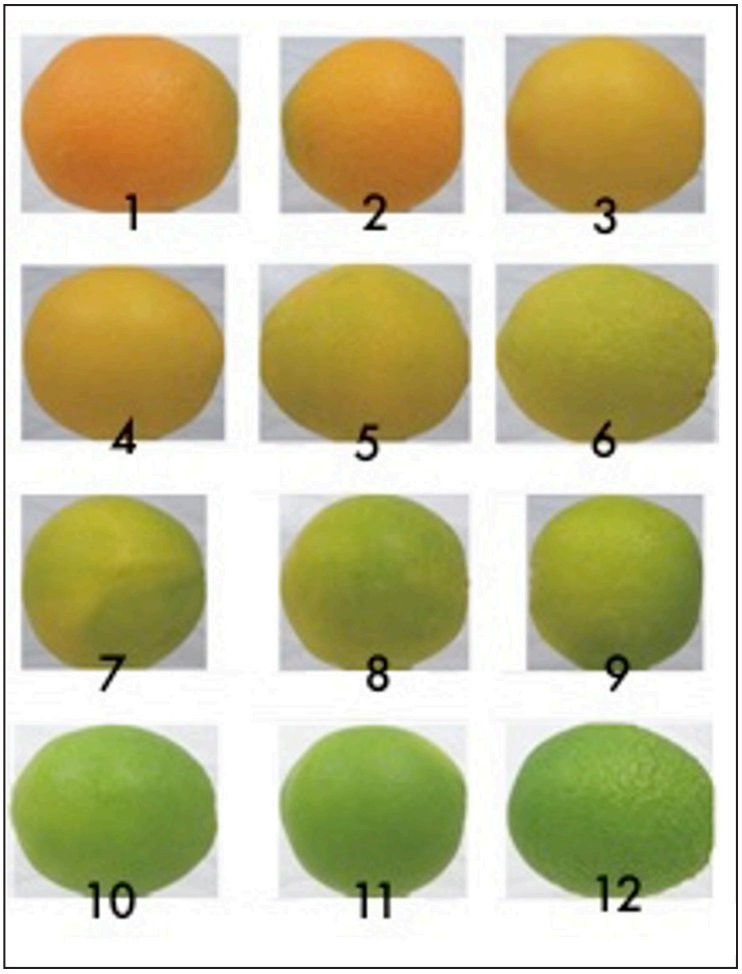
Conclusions: A small-plot lettuce trial in California, using three common lettuce varieties and four Vitazyme applications at 10 oz/acre (1 liter/ha), revealed that all three varieties responded very well to Vitazyme.

- Seed germination was improved by 6 to 16 percentage-points.
- Plant emergence was 7 days earlier.
- Plant height and diameter were substantially increased by 20 days after planting.
- Lettuce yield was enhanced by 57 to 62%.
- Tissue nutrient content was improved.
- Resistance to water stress was enhanced by 6 to 11%.

There results support the use of Vitazyme as a supportive product to enhance lettuce production in California and other lettuce producing locations.

Oranges *with Vitazyme application—Effects on Color Development*

Researcher: Javier Acevedo
Location: Agriocola de Purehue, Romeral-Quillota Province, Region V, Chile
Variety: Mandarin orange (*Citrus reticulata Blanco*), cv. W. Murcott on C 35 rootstock
Tree age: 16 years
Row spacing: 5 meters
In-row spacing: 2 meters
Irrigation: double-line drip tape
Experimental design: A mandarin orange grove in Chile was selected to evaluate the effect of Vitazyme on the yield, coloration, and fruit characteristics of the oranges. A completely randomized design with three trees per replicate was used to evaluate the effects. Color development is a key determinant of fruit quality and market value.



The Mandarin oranges were evaluated for fruit number and size, as well as yield, but also for fruit coloration, with Vitazyme markedly improving fruit color at harvest. Fully colored fruit were 57% greater with Vitazyme.

❶ *Control* ❷ *Vitazyme*

Fertilization: unknown, but equal for all trees
Vitazyme application: three foliar applications with an orchard sprayer, at 1 liter/ha, applied 45, 30, and 15 days before harvest; there was full canopy coverage, using about 2,000 liters/ha of water.
Growing season weather: The Aconcagua Valley, site of this study, possesses a Mediterranean climate with warm, dry summers and cool, rainy winters. The mean annual temperature is 15.3°C, with a mean maximum of 27°C and a mean minimum of 5.5°C. Annual rainfall averages 437 mm, with a 9-month frost-free period, from September through May.

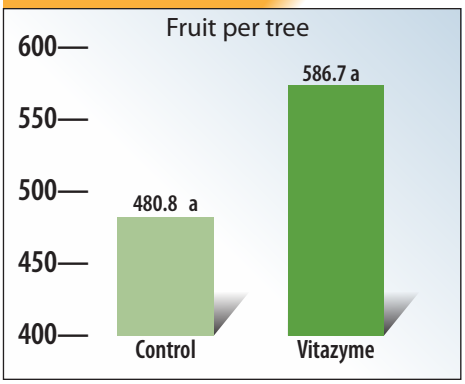
Fruit number results:

Treatment	Fruit number per tree[1]	Number change
	number	number
1. Control	480.8 a	—
2. Vitazyme	586.7 a	105.9 (+22%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to Duncan's Multiple Range Test.

Increase in fruit/tree with Vitazyme: 22%

Fruit Number Per Tree



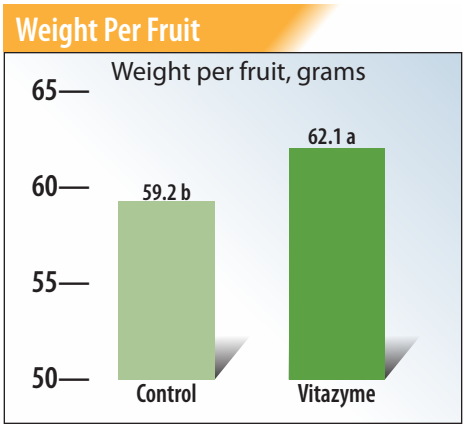
While there was no significant difference between the two treatments, due to high data variability, the number of fruit with Vitazyme was much greater than the control. Visual observations confirmed reduced pre-harvest fruit drop with Vitazyme.

Fruit weight results:

Treatment	Fruit weight[1]	Weight increase
	grams	grams
1. Control	59.2 b	—
2. Vitazyme	62.1 a	2.9 (+5%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to Duncan's Multiple Range Test.

Increase in average fruit weight with Vitazyme: 5%



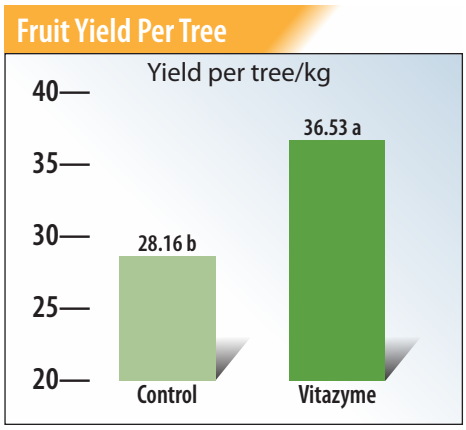
Vitazyme significantly increased the average orange weight, indicating enhanced nutrient partitioning and metabolic activity during fruit fill.

Fruit yield results:

Treatment	Fruit yield[1]	Yield increase
	kg/tree	kg/tree
1. Control	28.16 b	—
2. Vitazyme	36.53 a	8.37 (+30%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to Duncan's Multiple Range Test.

Increase in fruit yield per tree with Vitazyme: 30%



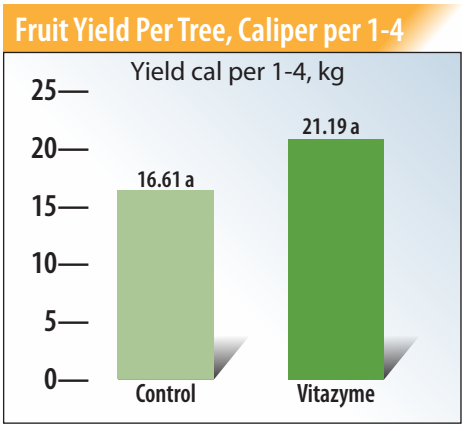
Vitazyme greatly improved the final fruit yield of the oranges, significantly by 30%, revealing the greater fruit retention and increased fruit number and size.

***Commercial fruit size results*:** The total of caliper 1-4 are shown here.

Treatment	Fruit yield[1]	Yield increase
	kg, cal 1-4	kg, cal 1-4
1. Control	16.61 a	—
2. Vitazyme	21.19 a	4.58 (+28%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to Duncan's Multiple Range Test.

Increase in fruit yield of caliper 1-4 with Vitazyme: 28%%

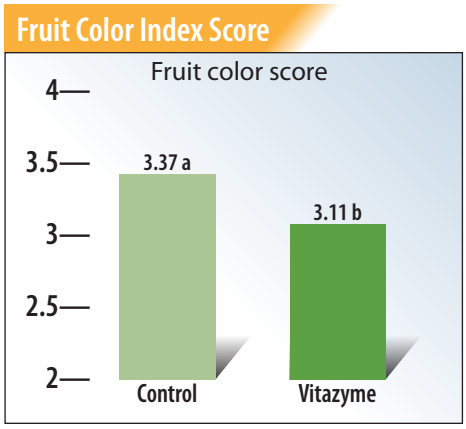


The yield of fruit having the most value, caliper 1-4, was increased by 28% by Vitazyme, though not significantly. This showed there was better fruit growth uniformity.

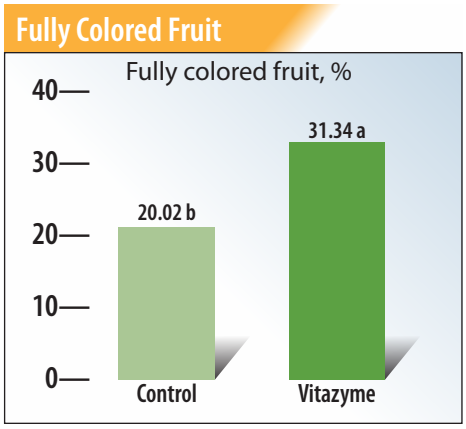
***Fruit color results*:**

Treatment	Color index[1]	Color index change	Fully colored fruit[1]	Colored fruit change
	index	index	kg/tree	kg/tree
1. Control	3.37 b	—	20.02 b	—
2. Vitazyme	3.11 b	- 0.26 (8%)	31.34 a	11.32 (+57%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to Duncan's Multiple Range Test.



Improvement in fruit color with Vitazyme: 8%



Improvement in fully colored with Vitazyme: 57%

Fruit coloration was improved significantly with Vitazyme at P = 0.05, with the green index industry scale reduced to 3.11, and the number of fully colored fruit increased greatly compared to the untreated control.

***Conclusions*:** This mandarin orange study in Chile revealed a number of benefits from three foliar applications of Vitazyme at 1 liter/ha at 45, 30, and 15 days before harvest:

(1) Significantly enhanced fruit color of oranges. The percentage of fully colored fruit increased from 71% to 86%, and the yield of fully colored fruit rose by 57%. This was due to an accelerated transition from green to orange color due to faster chlorophyll degradation and synthesis of carotenoids and anthocyanins.

(2) Average fruit weight and total yield per tree were significantly increased, by 5% and 22%, respectively.

(3) These results show that Vitazyme is a highly effective pre-harvest tool to accelerate color development, while reducing fruit drop and enhancing fruit quality and commercial value under Aconcagua Valley conditions.

Peppers *with Vitazyme application*

Researcher: David Holden
Research organization: Holden Research and Consulting, Camarillo, California
Field location: near Somis, California
Variety: Red Cyclone
Planting date: May 7, 2025
Soil analysis: pH (paste) = 7.2, organic matter = 2.47 %, NO_3-N = 41.2 ppm, PO_4P (Olsen) = 23.0 ppm, PO_4P (Bray) = 52.3 ppm, K = 433 ppm, Zn = 2.2 ppm, Mn = 10.7 ppm, Fe = 12.4 ppm, Cu = 2.5 ppm. Nutrient levels are extractible nutrients, and all are within the optimum range.
Experimental design: A small plot pepper trial in a randomized complete block design, using six replications, with plots being 5 x 15 feet, was established near Somis, California. Three treatments were applied, with all plots receiving the grower standard of fertilization, and one treatment received Vitazyme while another treatment received Vitazyme that had been fortified with a silicon additive. The purpose of the trial was to evaluate the effect of these two products on the yield, quality, and economic return of bell peppers versus the untreated control.

❶ *Control* ❷ *Vitazyme* ❸ *Vitazyme + Nano Yield*

Fertilization: The grower standard application totaled 169-40-45 lb/acre of N-P_2O_5-K_2O, applied as follows: 10 gal/acre of 10-34-0% N-P_2O_5-K_2O, (11 lb/acre of N, and 40 lb/acre of P_2O_5) on May 1; UN 32 (12 lb/acre of N) on May 7; 4 gal/acre of 3-0-11 % N-P_2O_5-K_2O (1.2 lb/acre of N and 4.5 lb/acre of K_2O) on May 12; 9.5 gal/acre of CAN (20 lb/acre of N) on May 19; 16.25 gal/acre of CAN 17 (17.4 lb/acre of N) on June 4; 23 gal/acre of CAN 17 (50 lb/acre of N) on June 25; 20 lb/acre of N as UN 32 and 20 lb/acre of N as KNO_3 on July 7; 20 lb/acre of N as UN 32 and 20 lb/acre of N as KNO_3 July 30.
Irrigation: The plants were watered on May 7 (24 hours), May 12 (24 hours), May 14 (2 hours), May 19 (6 hours, and June 4 (6 hours).
Vitazyme application: at planting to the soil in the root zone at 13 oz/acre (1 liter/ha) on May 7 and on the leaves and soil at 13 oz/acre (1 liter/ha) on June 10 and July 2, at early bloom and during fruit production, respectively
Nano Yield application: the same applications as Vitazyme, with 1 oz/acre (0.08 liter/ha) of Nano Yield added to Vitazyme. Nano Yield is a silicic acid aluminum sodium salt designed to improve the uptake of active agents.

A portion of the California pepper trial is shown here, showing the watering system using drip irrigation.

A portion of the California pepper trial is shown here, showing the watering system using drip irrigation.

Plant vigor results:

Treatment	Vigor Rating[1]			
	June 6	June 23	July 28	Average
1. Control	2. 1 b	2.4 a	1.6 a	2.0
2. Vitazyme	2.7 a	2.3 a	1.8 a	2.3
3. Vita + Nano	1.9 b	2.6 a	2.2 a	2.2

[1] Vigor rating of from 0 (poorest) to 5 (best). Means followed by the same letter are not significantly different at P = 0.10 according to the Student-Newman-Keuls Test.

The Vitazyme and Vitazyme + Nano Yield treatments showed the best vigor on average throughout the trial period.

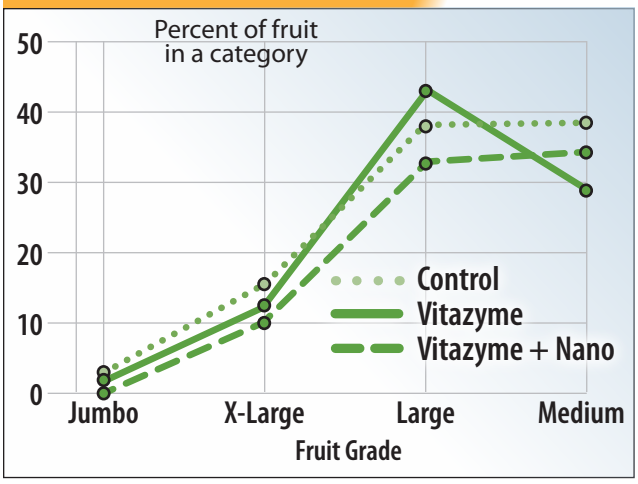
Fruit grade results: Fruit size was determined for two plants in each plot, and the percent of the fruit size for each grade was calculated at the end of the study, on August 20.

Treatment	Fruit in a size category[1]			
	Jumbo	X Large	Large	Medium
	%	%	%	%
1. Control	0 a	14 a	43 a	44 a
2. Vitazyme	1 a	19 a	39 a	41 a
3. Vita + Nano	1 a	15 a	46 a	38 a
LSD (P=0.1)	2.4	16 8	16.6	23.7
CV	318.0	100.7	37.4	65.4
Replicate probability (F)	0.611	0.506	0.416	0.926
Treatment probability (F)	0.632	0.847	0.725	0.904

[1]Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Both Vitazyme and Vitazyme + Nano Yield produced more fruit of the large size, especially the Nano Yield variation. Due to the large plot variations these differences were not significant at P = 0.1.

Fruit Size Distribution



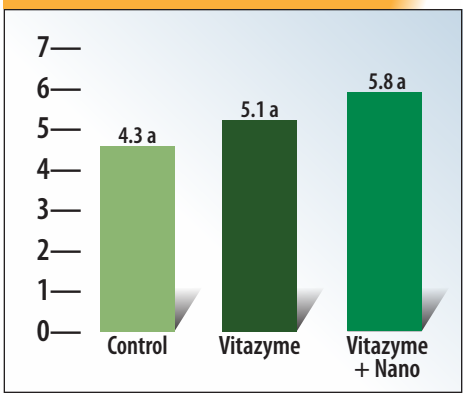
The bell peppers were sized according to industry standards, from Jumbo to medium sizes, with Vitazyme + NanoYield especially increasing the large size.

Marketable fruit number results: The total marketable fruit number was totaled and averaged for each plot.

Treatment	Marketable fruit	Fruit change
	number	number
1. Control	4.3 a	—
2. Vitazyme	5.1 a	0.8 (+19%)
3. Vita + Nano	5.8 a	1.5 (+35%)
LSD (P=0.1))	2.0	
CV	39.05	
Replicate probability (F)	0.6728	
Treatment probability (F)	0.4450	

[1]Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Marketable Fruit Number



The Vitazyme + Nano Yield treatment exceeded Vitazyme alone by 16%, and the control by 35%.

Increase in marketable fruit number with Vitazyme

Vitazyme only..... + 19%
Vitazyme + Nano Yield ..... + 35%

Unmarketable fruit results: The average number of unmarketable fruit per plot was calculated.

Treatment	Unmarketable fruit
	number
1. Control	3.7 a
2. Vitazyme	3.5 a
3. Vita + Nano	4.2 a
LSD (0.1)	3.6
CV	92.9
Replicate probability (F)	0.543
Treatment probability (F)	0.943

[1]Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

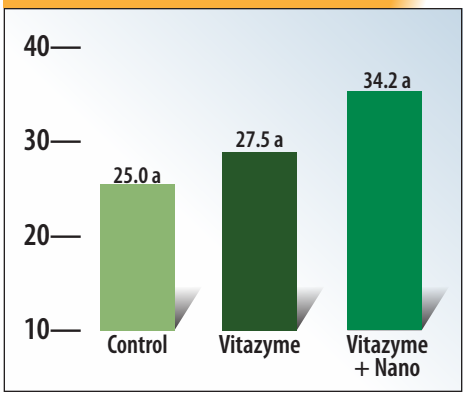
There were no significant differences in the number of unmarketable fruit for the three treatments.

Total marketable yield results: Plot values were extrapolated to a per acre basis.

Treatment	Fruit yield[1]	Yield change
	tons/acre	tons/acre
1. Control	25.0 a	—
2. Vitazyme	27.5 a	2.5 (+10%)
3. Vita + Nano	34.2 a	9.2 (+37%)
LSD (P=0.1)	15.1	
CV	49.96	
Replicate probability (F)	0.5414	
Treatment probability (F)	0.5395	

[1]Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Total Marketable Yield



While Vitazyme alone increased pepper yield, the Nano Yield greatly boosted the yield above Vitazyme alone, although the increases are not significant at P = 0.1.

Increase in marketable pepper yield with Vitazyme

Vitazyme only..... + 10%
Vitazyme + Nano Yield ..... + 37%

Economic return results: The estimated value of the peppers for processing contracts is $450/ton. The values shown here use this market value.

Return on investment

Cost of Vitazyme and Nano Yield (estimated):
$7.00/acre per 13 oz application[1]
Three applications = $21.00/acre.

Return on investment:
Vitazyme 54.5:1
Vitazme + Nano yield 198.2:1

1This cost will vary depending upon dealer pricing.

Treatment	Fruit yield[1]	Yield change
	$/acre	$/acre
1. Control	11,244 a	—
2. Vitazyme	12,388 a	1,144 (+10%)
3. Vita + Nano	15,407 a	4,163 (+37%)
LSD (P=0.1)	6.801	
CV	49.96	
Replicate probability (F)	0.5414	
Treatment probability (F)	0.5395	

[1]Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Increase in farm increase

Vitazyme $1,144/acre
Vitazyme + Nano Yield $4,163/acre

Conclusions: A small-plot bell pepper study in California revealed that Vitazyme alone, or incorporated with Nano Yield adjuvant, enhanced the yield and income of the peppers, although due to high plot variability the increases were not significant. More large peppers were harvested with the two products, and pepper number was also increased, with the final yield being increased by 2.5 tons/acre with Vitazyme alone, and 9.2 tons/acre with Nano Yield incorporated with it. These increases resulted in income increases of $1,144/acre and $4,163/acre, respectively. Return on investment ranged from 54.5:1 for Vitazyme, to 198:1 for Vitazyme + Nano Yield. These results show an excellent prospect for utilizing this silicon adjuvant to improve the activity of Vitazyme for vegetable crops.

Potatoes *with Vitazyme application*

Researcher: Robert Kürzinger
Research organization: Agro Nord-Kürzinger GbR Testing Center for Potato Research — field trials, plant protection, and phytodiagnostics, GroB Lüsewitz, Mecklenburg-Western Pomerania, Germany
Research cooperator: Casper Meiners, Ag Bio Tech
Location: Sanitz (Agro Nord test area), Mecklenburg-Western Pomerania, Germany
Variety: Goldmarie ***Planting date:*** May 29, 2024 ***Row spacing:*** 75 cm ***In-row spacing:*** 28 cm
Previous crop: rapeseed ***Soil type:*** IS/35
Soil analysis: pH = 5.6, humus = 2.2%, NO_3-N = 27 kg/ha, NH_4-N = 2 kg/ha, S = 29 kg/ha, P = 4.4 mg/100g, K = 7.5 mg/100 g, Mg – 6.5 mg/100 g, B = 0.2 ppm, Cu = 7.6 ppm, Mn = 14.0 ppm, Zn = 1.4 ppm, Fe = 139 ppm
Experimental design: A small-plot potato trial was established in northeastern Germany to evaluate the effects of Vitazyme biostimulant on the growth, quality, and yield of potatoes. Plots were randomly arranged with four replications; they were four rows wide (7 x 3 m = 21 m^2).

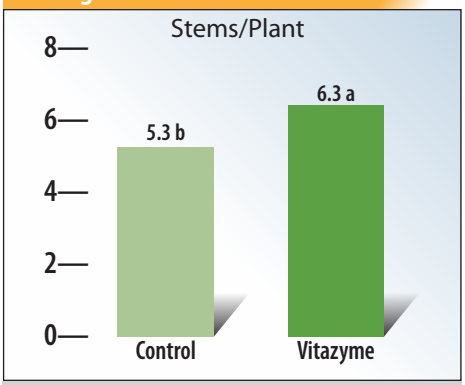
1 *Control* 2 *Vitazyme*

Fertilization: 13-5-17% N-P_2O_5-K_2O fertilizer at 0.8 ton/ha, and a second application at 0.113 ton/ha
Vitazyme applications: (1) Seed piece treatment at planting of a dip in a 5% Vitazyme solution; (2) 1 liter/ha sprayed on the leaves and soil at tuber formation on June 21; (3) same as (2) on June 28; (4) 1 liter/ha sprayed on the leaves before harvest on September 27. Total application volume: 3 liters/ha + seed treatment.
Herbicide applications: Sencor Liquid, and Cato-Komp two times
Fungicide applications: Infinito, Zoevec Endavia, Ranman Top, Revus Top, and Canal Flex
Insecticide treatments: Bay of Biscay, Coragen, and Teppeki
Growing season weather: normal
Plant emergence results: All plants emerged.
Stem number results: Forty plants for each treatment (10 plants per plot) were evaluated for stem number, and averaged for both treatments.

Increase in stem number per plant with Vitazyme: 19%

There were significantly more stems for the Vitazyme treated potato plants than for the control plants.

Average Stems Per Plant[1]



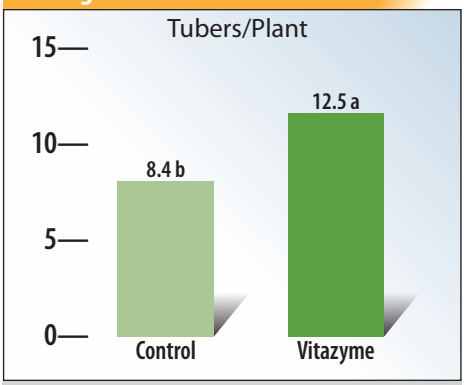
[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

Tuber number results: Forty plants for each treatment (10 plants per plot) were evaluated for tuber number, and averaged for both treatments.

Increase in tubers per plant with Vitazyme: 49%

There were nearly 50% more tubers per plant with Vitzyme treatment compared to the control treatment.

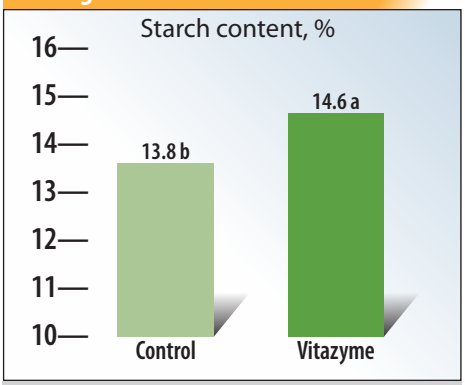
Average Tubers Per Plant[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

Starch content results: Forty plants for each treatment (10 plants per plot) were measured for starch content in a laboratory, and averaged for both treatments.

Average Tuber Starch Content[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

Increase in tuber starch content with Vitazyme: 0.8 percentaage point

The tuber starch content was significantly increased with Vitazyme application, increasing by not quite a whole percentage point.

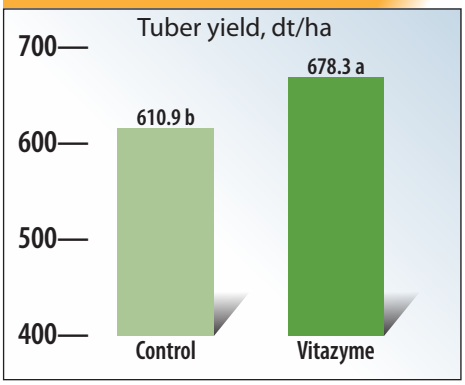
Potato tuber yield results:

Treatment	Tuber yield[1]	Yield change
	dt/ha	dt/ha
1. Control	610.9 b	—
2. Vitazyme	678.3 a	67.4 (+11%)

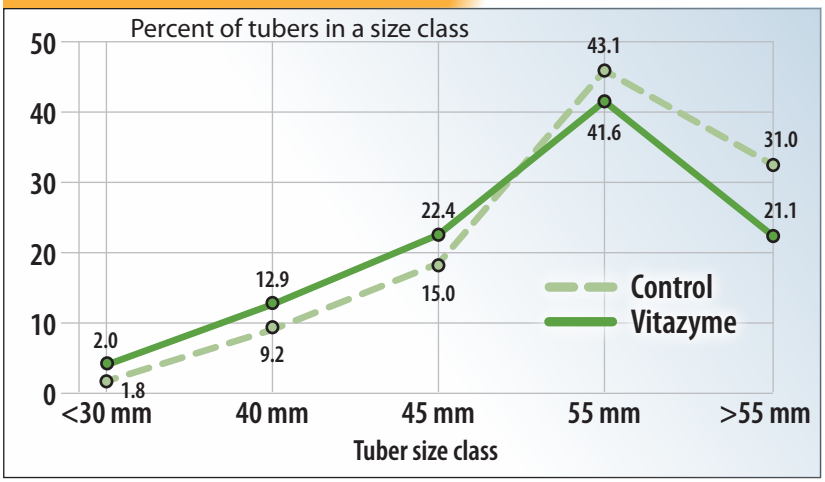
[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

Increase in potato tuber yield with Vitazyme: 11%

Tuber Yield



Tuber Size



The Vitazyme treatment substantially increased tuber yield (11%), while producing more uniform tubers in the preferred 40-55 mm classes.

Conclusions: This small-plot potato trial in Germany, using a seed treatment and three soil and foliar applications of Vitazyme at 1 liter/ha, showed that Vitazyme significantly increased stem number (19%), tuber number (49%), starch content (0.8 percentage-point), and total yield (11%), while producing more uniform tuber sizes compared to the control treatment. These results indicate the great efficacy of Vitazyme as an adjunct to potato growing programs.

Soybeans *with Vitazyme application—A Silicon Additive Study*

Researcher: Lance Taylor
Research organization: Crossroads Ag Research, Denver, Iowa
Field location: Dunkerton, Black Hawk County, Iowa
Variety: LG Seed 55C32 STX PRO
Planting date: May 14, 2025
Planting depth: 1.5 inches
Row spacing: 30 inches
Seeding rate: 140,000 seeds/acre
Tillage: conventional
Soil type: Maxfield silty clay
Fertility level: good
Soil drainage: excellent
Soil analysis: pH = 5.8, organic matter = 7.5%, cation exchange capacity = 26.9 meq/100 g, Bray P1 = 13 ppm, Bray P2 = 27 ppm, K = 106 ppm, Mg = 545 ppm, Ca = 3390 ppm (at 6 inches, Midwest Labs)

The soybean plants treated with Vitazyme plus the Si product show the greatest plant size, pod set, and root mass of the three treatments .

Experimental design: A small-plot randomized complete block design with four replications was established, using plots that were 15 x 30 feet. There were six rows per plot, with the middle two rows harvested. The purpose of the trial was to evaluate the effectiveness of Vitazyme and a silicon additive to increase soybean yield.

❶ *Control* ❷ *Vitazyme* ❸ *Vitazyme + Nano Yield*

Fertilization: none
Vitazyme applications: 13 oz/acre (1 liter/ha) in-furrow at planting; 13 oz/acre (1 liter/ha) sprayed on the leaves and soil at early bloom on July 9
Nano Yield application: The Nano Yield solution was mixed with Vitazyme for both applications to obtain a 1 oz/acre (0.08 liter/ha) application rate. Nano Yield is a silicic acid aluminum sodium salt designed to improve the uptake of active agents.
Herbicide applications: May 14 – Zidua Pro; June 14 – Outlook, Liberty Ultra, Round Up, Power Max, and AMS; July 1 – Outlook, Liberty Ultra, Round Up Power Max, Vaquero, and AMS.
Growing season weather: average precipitation and temperature
Harvest date: October 11, 2025
Leaf chlorophyll results: Chlorophyll determinations made on July 27 did not reveal any significant differences among the three treatments.
Bean moisture results: There were no significant differences in soybean moisture content for the three treatments.

Bean yield results:

Treatment	Bean yield[1]	Yield change
	bu/acre	bu/acre
1. Control	72.8 b	—
2. Vitazyme	77.8 a	+5.0 (+7%)
3. Vitazyme + Nano	77.4 a	+4.6 (+6%)
LSD (P=0.15)	3.5	—
CV	3.97	—
Replicate probability (F)	0.1595	—
Treatmen probability (F)	0.1079	—

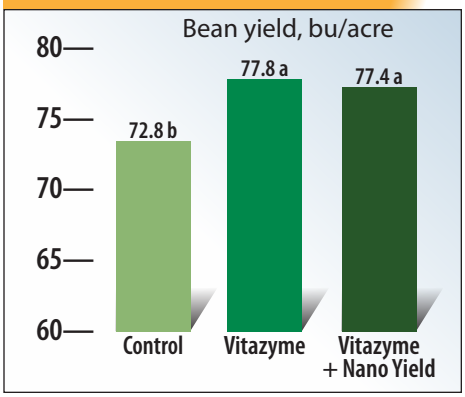
[1]Means followed by the same letter are not significantly different at P = 0.15, according to the Student-Newman-Keuls Test.

The silicon additive to Vitazyme made a significant contribution to the growth and yield of the soybeans in this east central Iowa study.

Soybean Yield Increase

Vitazyme 7%
Vitazyme + Nano Yield ... 6%

Bean Yield Results



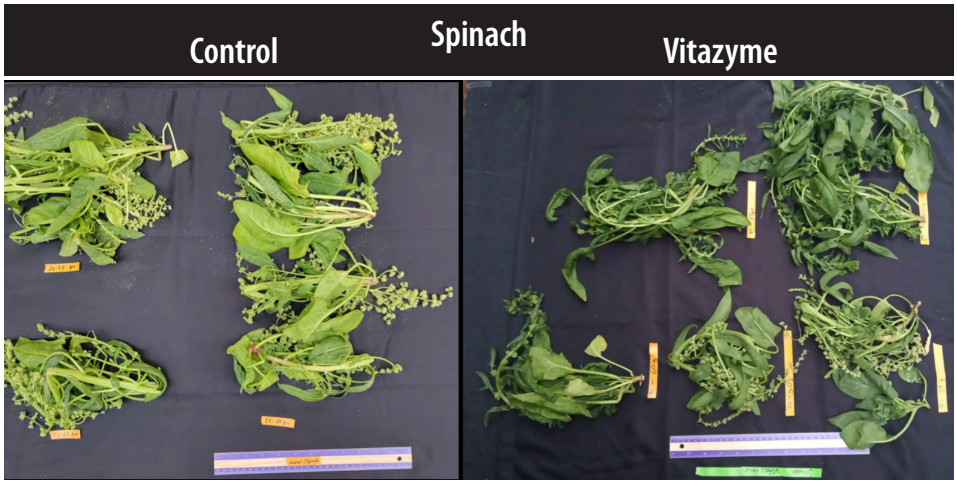
Conclusions: A small-plot replicated soybean trial, completed in east-central Iowa, comparing an untreated control with Vitazyme (in-furrow and early bloom foiliar) and Vitazyme + Nano Yield (1 oz/acre or 0.08 liter/ha with Vitazyme) treatments revealed that both treatments significantly increased bean yield by 6 to 7%. There was no difference between the increase for the two treatments, showing that either of them is sufficient to improve soybean yield and profits. For soybeans selling at $11.00/bu and Vitazyme costing $12.00 for two applications, the 5.0 bu/acre yield increase produced a $43.00/acre increase in income, or a 4.6:1 return on investment.

Spinach *with Vitazyme application*

Researcher: Rajnish Khanna, Ph.D.
Research organization: i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California
Variety: unknown
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 5-gallon pots, to compare the effects of Vitazyme on fresh weight compared with untreated controls. Seven pots were used for each treatment.

❶ ***Control*** ❷ ***Vitazyme***

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants



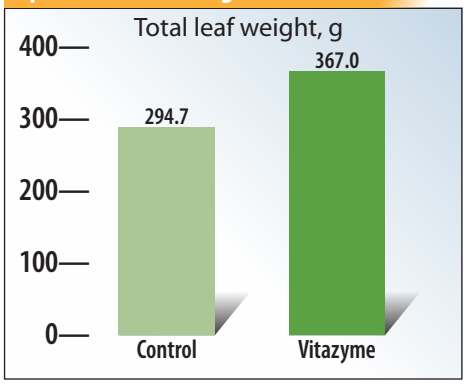
The effect of Vitazyme on spinach leaf and root growth was excellent in this California trial, giving a 25% increase in fresh weight.

Yield results: The mature plants in each pot were weighed, and the values were totaled

Increase in spinach fresh weight with Vitazyme: 72.3 g (+ 25%)

Conclusions: This greenhouse pot trial with spinach, using Vitazyme every 14 days, showed that the fresh weight of the spinach was increased by 25%, or 10.3 grams per plant.

Spinach Fresh Weight



Sugar Beets *with Vitazyme Bio application*

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: LLC "PC Zoria Podillia," Ohiivka Village, Haisyn District, Vinnytsia Region, Ukraine
Variety: BTS 2730
Planting date: April 15, 2025
Seeding rate: 110,000 seeds/ha
Tillage: disking to 6-8 cm, subsoiling to 25 cm, harrowing to 2-3 cm with a Europak Combined Unit
Previous crop: winter wheat
Soil type: gray podzolic (2.2% organic matter)
Experimental design: A commercial sugar beet field was divided into an untreated control area and a Vitazyme Bio treated area, all other practices being the same for the entire area. The purpose of the trial was to evaluate the effect of a biostimulant on sugar beet yield and sugar content.

Ukraine 2025. Sugar beet harvest is in full swing for this trial field in the Vinnytsia Region in 2025. The yield increase was 25%.

❶ Control ❷ Vitazyme Bio

Fertilization: 110-0-72 kg/ha of N-P_2O_5-K_2O applied the previous fall before subsoiling, and 4-12-17 kg/ha of N-P_2O_5-K_2O applied in-furrow at planting
Vitazyme Bio application: 1.0 liter/ha (13 oz acre) sprayed on the leaves and soil at row closure (BBCH 34) on June 13, 2005

Yield results:

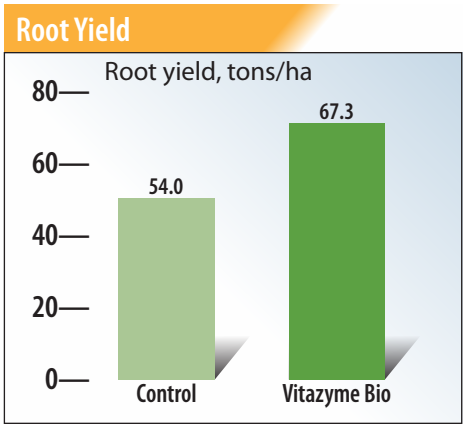
Treatment	Root yield	Yield change	Sugar content	Sugar yield	Yield change
	tons/ha	tons/ha	%	tons/ha	tons/ha
1. Control	54.0	—	17.8	9.6	—
2. Vitazyme Bio	67.3	13.3 (+25%)	17.8	12.0	2.4 (+25%)

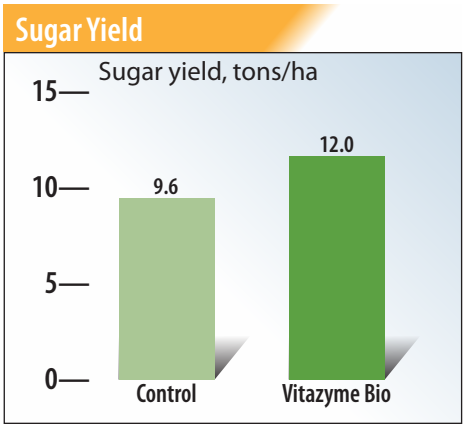
Increase in root yield with Vitazyme Bio: 25%

Increase in sugar yield with Vitazyme Bio: 25%

Here are three of the research workers for the sugar beet harvest for the 2025 Vitazyme Bio trial at Ohiivka Village. Paul Ivanicky, representative for Plant Designs International, is on the left.

The researcher is standing at the boundary of the Vitazyme Bio treatment, which increased the yield of both total root weight as well as sugar by 25%. The yield increase did not produce a drop in sugar content.





Income results: The extra 25% increase in sugar production produced $680/ha extra income for the farmer.

Conclusions: A field-scale sugar beet trial in Ukraine involved the use of Vitazyme Bio, at 1.0 liter/ha (13 oz/acre) sprayed on the leaves and soil at row closure (BBCH 34), with Vitazyme Bio being the only variable across the field. The biostimulant improved both root yield and total sugar yield, by 25% in both cases since the sugar content of both treatments was 17.8%. An additional $680/ha was gained by the farmer for this application, showing that adding Vitazyme Bio to sugar beet programs in Ukraine is a highly profitable practice.

Sunflowers *with Vitazyme Bio application*

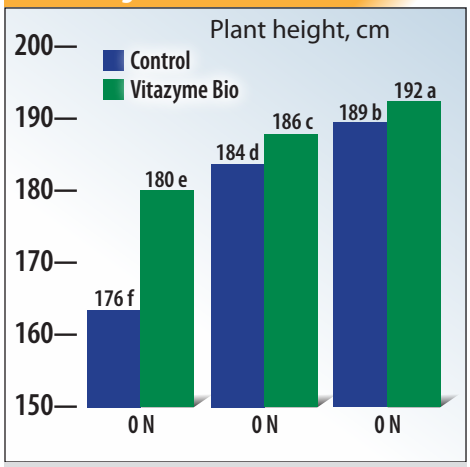
Researcher: Y. A. Veklenko
Research organization: National Academy of Agrarian Sciences of Ukraine, and Institute of Feed and Agriculture of Podilla, Vinnytsia, Ukraine
Location: Agronomichne Village, Vinnytsia District, Vinnytsia Region, Ukraine
Variety: MAS 817.P (MAS Seeds, France), early maturing, linole type

The experimental area of the sunflower trial is shown here in the full flowering stage.

Planting rate: 60,000 seeds/ha
Planting date: May 2, 2024 ***Emergence date:*** May 13, 2024 ***Previous crop:*** spring barley
Soil type: gray forest soil, medium loamy on loess
Soil analysis: organic matter = 2.2-2.4%, pH (salt extract) = 5.2-5.4, 9.0-11.2 mg of easily hydrolyzable N/100 g of soil, 8.1-11.6 mg of exchangeable K/100 g of soil, 12.1-14.2 mg of mobile P/100 g of soil
Tillage: fall plowing to 20-22 cm, spring disking to 10-12 cm, pre-sowing cultivation to 5-7 cm
Experimental design: A small-plot trial with sunflowers in Ukraine was established to evaluate the effect of Vitazyme Bio on the growth yield, and quality of sunflower seeds, at three rates of nitrogen. Four replications of 56 m^2 each were used, with plots arranged in a randomized complete block design.
Fertilization: Ammonium nitrate was applied at either 30 or 45 kg/ha to treatments 3 to 6 at the 3 to 4 leaf-pair stage of the sunflowers.
Vitazyme Bio application: 1 liter/ha sprayed on the leaves and soil at the 3 to 4 leaf-pair stage (BBSN 16-18), on June 3, 2024
Weed Control: Alpha-Promethrin at 3.0 liters/ha, Antizlak at 0.8 liter/ha, and Geliantex at 0.045 liter/ha
Harvest date: unknown (October)
Growing season weather: The season was rather warm, with adequate rainfall.
Plant morphological development results:

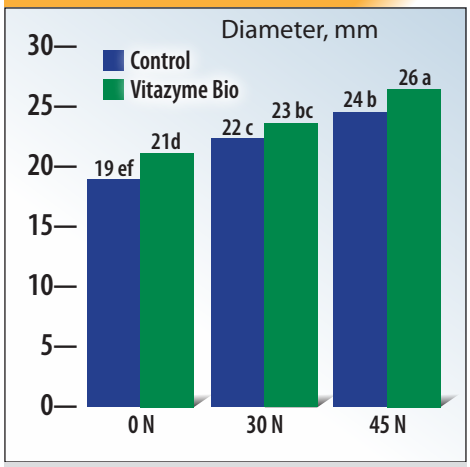
Treatment	Nitrogen	Vitazyme
	kg/ha	
1. 0 N	o	o
2. 0 N + Vita	o	x
3. 30 N	30	o
4. 30 N + Vita	30	x
5. 45 N	40	o
6. 45 N + Vita	40	x

Plant Height[1]



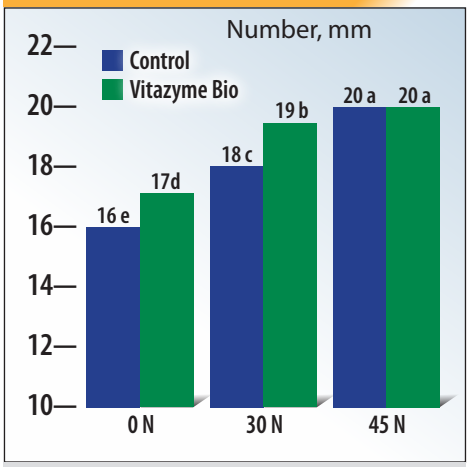
[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Stem Diameter[1]



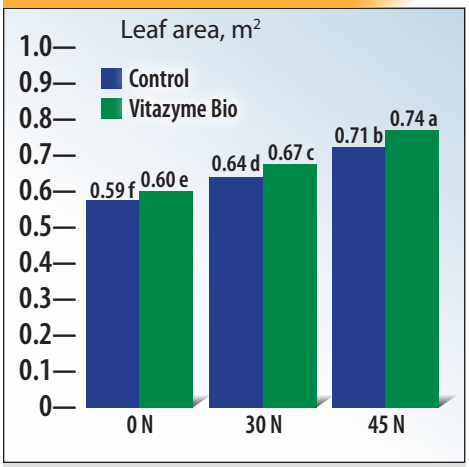
[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Leaf Number[1]



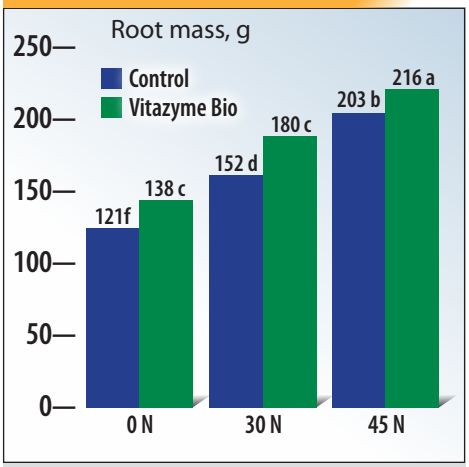
[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Leaf Area[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

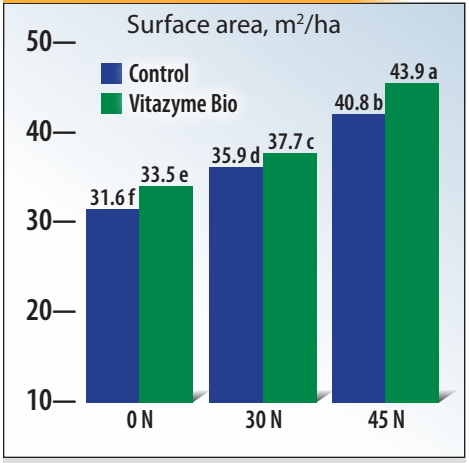
Root Mass[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

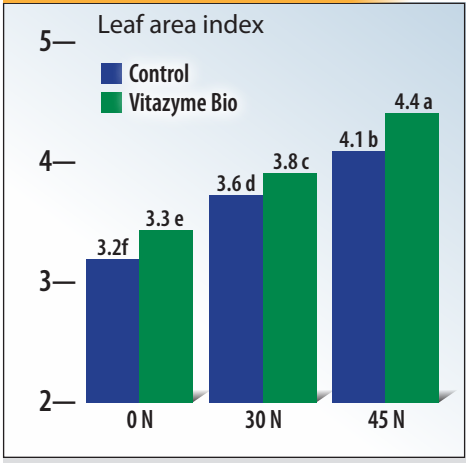
Nearly all morphological parameter measurements were significantly improved by Vitazyme Bio at each N level at P = 0.05.

Leaf Surface Area[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Leaf Surface Index[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Both the leaf surface area and the leaf area index were significantly increased with Vitazyme Bio at P = 0.05 at all three N levels.

Plant disease results:

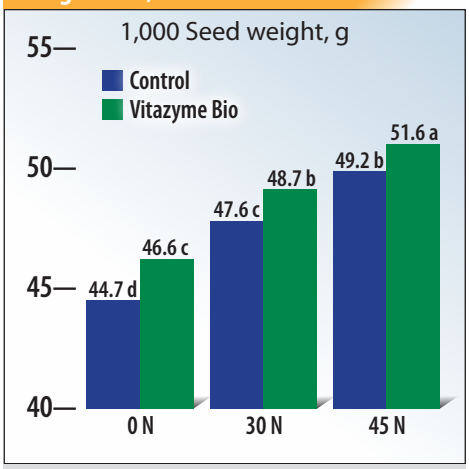
Treatment	Phomosis[1]		Phomopsis[1]		Sclerotinia[1]		Lodging[1]	
	Plants	Area	Plants	Area	Plants	Area	Plants	Area
	%	0-9	%	0-9	%	0-9	%	0-9
ON	18	2	22	2	58	6	12	1
ON + Vita	10	1	17	2	42	4	8	1
30 N	12	1	18	2	47	5	5	0
30 N + Vita	8	1	14	1	34	3	3	0
45 N	8	1	16	2	23	2	1	0
45 N + Vita	4	0	8	1	20	2	0	0

[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).
NOTE: Plants = percentage of plants affected. Area = the estimited leaf, head, and stem area affected by the disease or lodging of plants; 0 is no infection, 9 is severely infected.

Vitazyme Bio in all cases reduced the infection rate of the three plant diseases evaluated: phomosis (*Phomamacdonaldii*), phomopsis (*Diaporthehelianthi*), and sclerotinia (*Sclerotiniasclerotiorum*). Lodging of plants was also reduced with Vitazyme Bio.

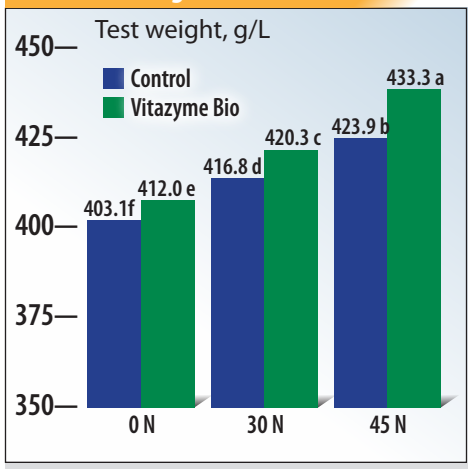
Seed and test weight results:

Weight of 1,000 Seeds[1]



[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

Seed Test Weight[1]

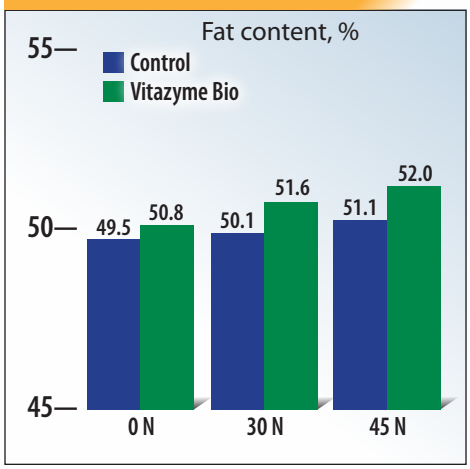


[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA)

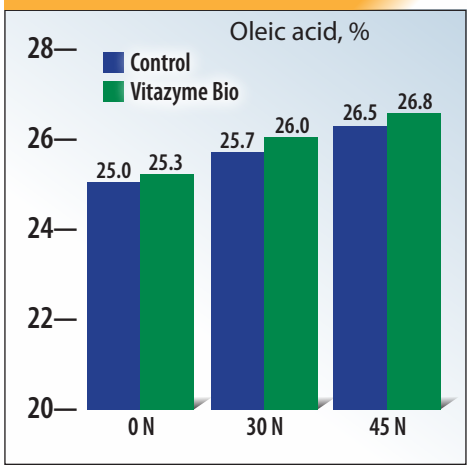
Vitazyme Bio enhanced 1,000 seed weight significantly in all cases at all N levels, by 4% with 0 N and by 5% at 45 N. Test weight was also in every case increased significantly by Vitazyme Bio by up to 2%.

Seed quality results: Analyses were made at the institute of Feed and Agriculture of Podillya of the National Academy of Agrarian Sciences of Ukraine.

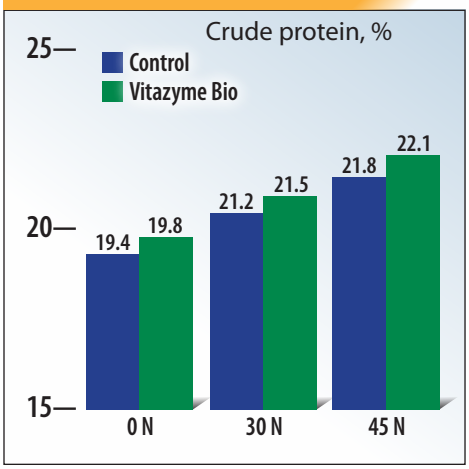
Seed Fat Content



Seed Oleic Acid Content



Seed Crude Protein Content



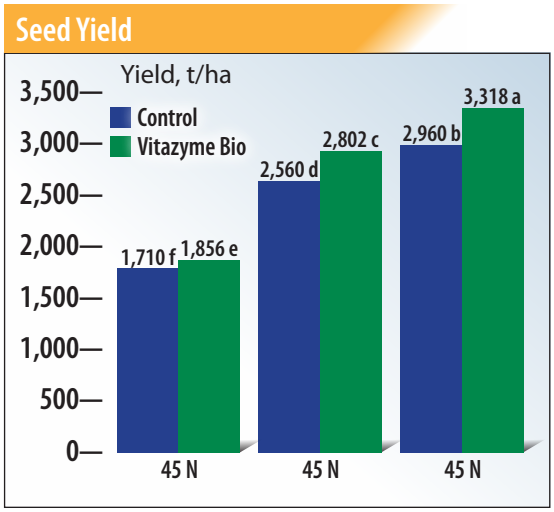
Seed fat, oleic acid, and crude protein all increased with Vitazyme Bio treatment at all three N levels. No statistics were run for these three parameters.

Here is shown some sunflower diseases for the Ukraine trial, which were evaluated for diseases during the "lemon ripeness" stage.

Sunflower seed yield results:

Treatment	Seed yield[1]	Yield change[2]
	t/ha	
1. 0N	1,710 f	—
2. 0N + Vitazyme Bio	1,856 e	146 (+9%)
3. 30 N	2,560 d	—
4. 30 N + Vitazyme Bio	2,802 c	242 (+9%)
5. 45 N	2,960 b	—
6. 45 N + Vitazyme Bio	3,318 a	350 (+12%)

[1]Means followed by the same letter are not significantly different at P = 0.05 (ANOVA). Yields are of the standardized adjusted weights at a uniform moisture content.
[2]Yield increases are calculated for the same N level.



Yield increase with Vitazyme Bio

0 N..... 9%
30 kg/ha N 9%
45 kg/ha N 12%

Vitazyme Bio significantly improved the seed yield at every N level, by up to 12% at the 45 kg/ha N rate.

Income results:

Treatment	Yield	Increase	Value	Vitazyme application	Income increase
	t/ha	t/ha	$/ha	$/ha	$/ha
1. 0N	1,710	—	—	—	—
2. 0N + Vitazyme Bio	1,856	146	87.6	24	63.6
3. 30 N	2,560	—	—	—	—
4. 30 N + Vitazyme Bio	2,802	242	145.2	24	121.2
5. 45 N	2,960	—	—	—	—
6. 45 + Vitazyme Bio	3,318	358	214.8	24	190.8

Increase in income with Vitazyme

0 N..... $63.60/ha
30 kg/ha N $121.20/ha
45 kg/ha N $190.80/ha

Conclusions: Based on the research work, the following scientific conclusions can be formulated regarding the effect of the biological product Vitazyme Bio on the yield and quality of sunflower of the MAS 817.P hybrid in the conditions of the Vinnytsia region in 2024:

1. ***Duration of the growing season:*** The use of Vitazyme Bio, especially in combination with nitrogen fertilizers, contributed to the extension of the growing season of sunflower, which had a positive effect on the rational use of the bioclimatic potential of the growing region.
2. ***Morphometric indicators:*** Vitazyme Bio at P = 0.05 had an impact on the morphometric indicators of sunflower plants, in particular on the increase in plant height (up to 3%); stem diameter (up to 10%); head diameter (up to 12%); leaf surface area (up to 25%); mass of the root system (up to 18%).
3. ***Photosynthetic potential of crops:*** The use of Vitazyme Bio, especially in combination with 45 kg/ha of N, significantly increased leaf surface area and LAI, which indicates an increase in plant photosynthetic activity.
4. ***Disease resistance:*** Vitazyme Bio had a positive effect on the resistance of sunflower to major fungal diseases (phomosis, phomopsis and sclerotinia), especially in combination with 45 kg/ha of N, significantly reducing the level of plant damage.
5. ***Quality indicators of seeds:*** Vitazyme Bio had a positive effect on the quality indicators of seeds, increasing the indicators of seed nature (up to 2%), weight of 1000 seeds (up to 5%), fat content in seeds (up to 1.5%), oleic acid content (up to 0.3%), and crude protein content (up to 0.7%).

6. ***Plant density and seed moisture:*** The use of Vitazyme Bio in combination with nitrogen fertilization contributed to better plant survival during the growing season, and an increase in the final stand density (up to 1.1-2.9%), and an increase in seed moisture before harvesting (up to 0.2-1.0%).
7. ***Seed yield:*** The use of Vitazyme Bio increased the biological yield of sunflower by 3-7%, depending on the fertilization option, reaching a maximum (3,567 t/ha) with 45 kg/ha of N. With direct combining, the increase was 9-12%, with a maximum seed harvest of 3,318 t/ha from the most fertilized variant.
8. ***Cost-effectiveness:*** The use of Vitazyme Bio is economically justified, providing a profit increase of from 63.6 USD/ha to 121.2-190.8 USD/ha.

It is clear that Vitazyme Bio improves the utilization of fertilizer nitrogen, and use of the biostimulant is highly recommended in Ukrainian sunflower production.

Here the researchers of the Ukraine sunflower trial are evaluating the "biological yield" of the various plots, which revealed superior yields with Vitazyme treatment.

Vitazyme Field Tests for 2025

Swiss Chard *with Vitazyme application*

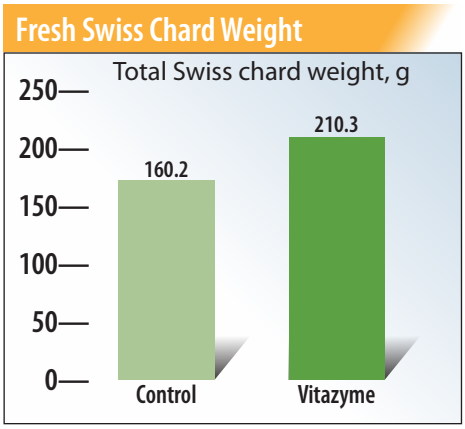
Researcher: Rajnish Khanna, Ph.D.
Research organization: i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California
Variety: unknown
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 3-gallon pots, to compare the effects of Vitazyme on fresh weight compared with untreated controls. Four pots were used for each treatment.

❶ ***Control*** ❷ ***Vitazyme***

Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants

Yield results: The mature plants in each pot were weighed, and the values were totaled.

Increase in Swiss chard fresh weight with Vitazyme: 50.1 g (+ 31%)



Conclusions: This greenhouse pot trial with Swiss chard, using Vitazyme every 14 days, showed that the fresh weight of the plants was improved by 31%, or 12.5 grams per plant. These results show the excellent effect of Vitazyme to increase the productivity of Swiss chard.

Turnips *with Vitazyme application*

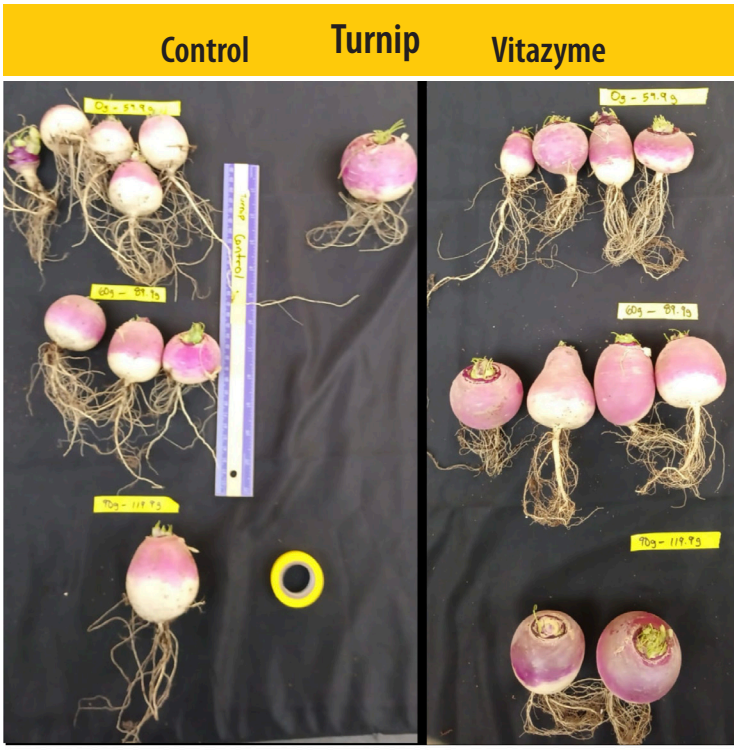
Researcher: Rajnish Khanna, Ph.D.
Research organization: i-Cultiver, Manteca, California
Location: USDA Plant Gene Expression Center, Albany, California
Variety: unknown
Growth media: Sunshine Mix #1 (Sungro Horticulture)
Experimental design: A greenhouse trial was established using 4-gallon pots, to compare the effects of Vitazyme on root weight compared with untreated controls. Ten pots were used for each treatment.

❶ *Control* ❷ *Vitazyme*

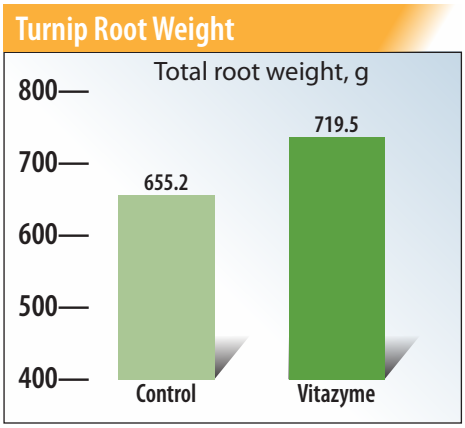
Fertilization: Peters Professional 20-20-20 water soluble fertilizer applied at 1:64 dilution each week
Vitazyme application: a 1% Vitazyme solution sprayed on the leaves and soil, to the dripping point, every 14 days beginning at the four-leaf stage until flowering or harvest
Disease control: Floramite and Decathlon at 0.25 tsp/gal, sprayed at 1-2 gal/100 plants
Yield results: The roots in each pot were weighed, and totaled for both treatments.

Increase in Turnip root weight with Vitazyme: 64.3 g (+ 10%)

Conclusions: This greenhouse pot trial with turnips, using Vitazyme every 14 days, showed that the fresh weight of the roots was increased by 10%, or 6.4 grams per plant.



Turnips responded well to Vitazyme application in this California trial, increasing by 10% in fresh weight



Walnuts(Julans regia) *with Vitazyme application*

Researchers: Constanza Parra and Nicolas Miranda
Research organization: Syngenta Chile, and Plant Designs, Rochester, New York, respectively
Location: Naltagua, Central Chile ***Variety:*** Chandler ***Soil type and analysis:*** unknown
Experimental design: A walnut orchard was divided into a standard-treated area and a Vitazyme-treated area, to evaluate the effects of Vitazyme on Walnut quality as well as tree vigor. ***Fertilization:*** unknown

❶ *Control* ❷ *Vitazyme*

Vitazyme applications: Two applications were made with an orchard sprayer on the soil and leaves: (1) 3 liters/ha on December 2, 2024; (2) 1.5 liters/ha on January 6, 2025.

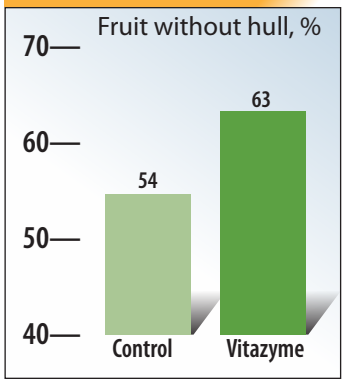
Hull opening and maturity results: At harvest, fruits on the ground were separated into two categories: those with the green husk attached and those with the hull detached, indicated greater physiological maturity. Then, two parameters were evaluated: (1) percent of fruit without a hull, and (2) kernel to hull ratio for fruit with the hull still attached.

Treatment	Fruit without hull	Change	Kernel to hull ratio	Change
	%	%	%	%
1. Control	54	—	55	—
2.Vitazyme	63	9 (+17%)	62	7 (+13%)

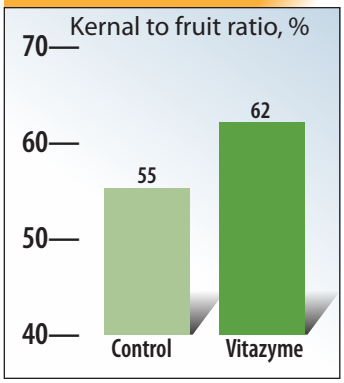
The Vitazyme treated walnuts were of superior size and matured earlier, while having better coloration which favored better processing performance.

Increase in the fruit without a hull with Vitazyme: 9 percentage points

Fruit Without a Hull



Kernal to Hull Ratio



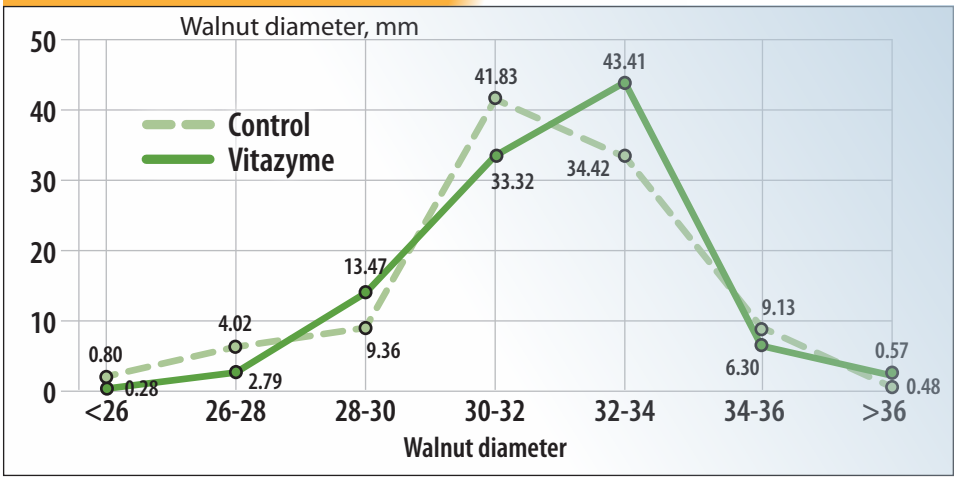
Increase in the kernel to hull ratio with Vitazyme: 7 percentage points

These data reveal an advanced maturity and kernel development at harvest with Vitazyme.

Nut size distribution results: These data show the average nut size distribution for three replicates for the two treatments.

Control Nuts: mostly in the 30-34 mm range
Vitazyme nuts: a shift towards larger diameter nuts in the 32-36 mm range

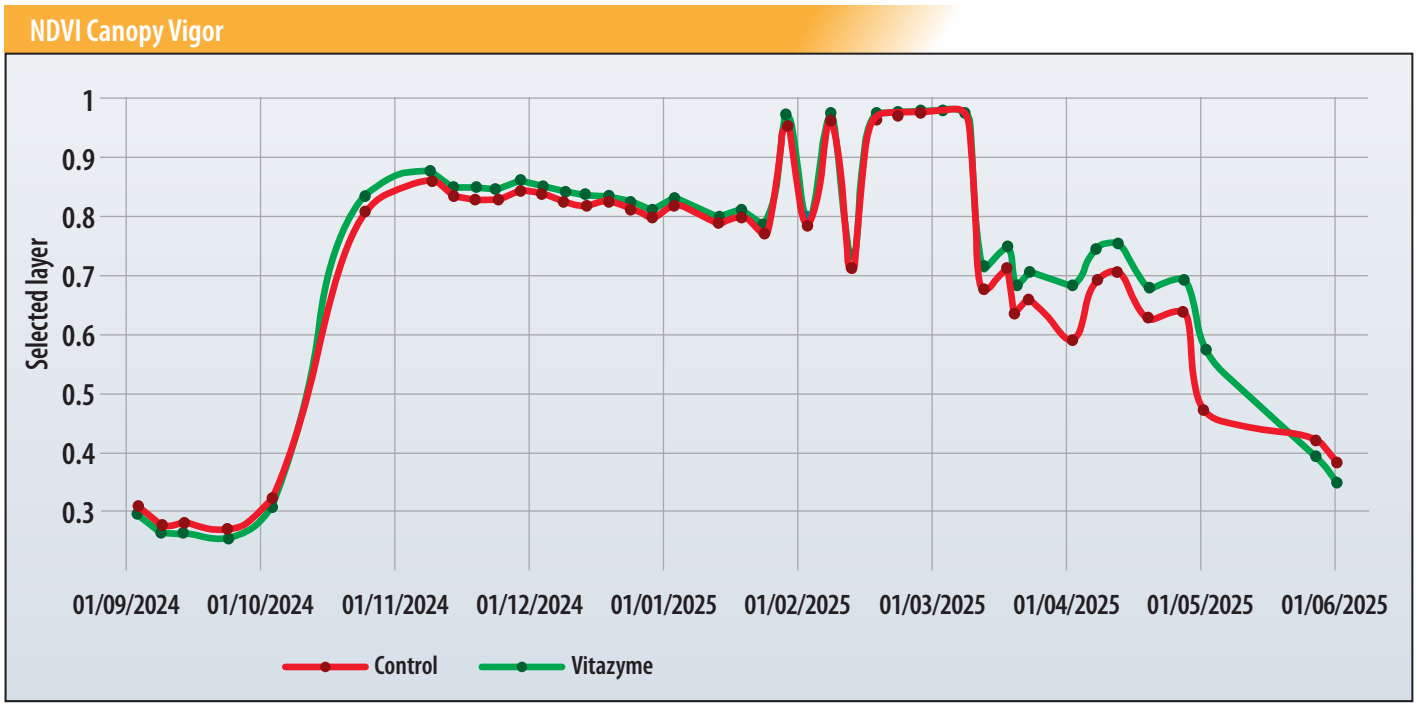
Walnut Size Distribution



Kernel color results: Industry standard color evaluations were made for three replicates of both treatments: extra light, light, light amber, and amber.

Treatment	Color tendency	Interpretation
1. Control	Mixed light and light amber	Normal color distribution; some dark kernels
2.Vitazyme	Mostly light and extra light	Improved color uniformity and brightness

NDVI canopy vigor results: NDVI measurements were taken at several times during the growing season. These measurements are displayed in the accompanying graph. NDVI (Normalized Difference Vegetative Index) measures the difference between near-infrared and red light to quantify vegetative health, using satellite imagery. It ranges from -1 to 1, where higher values indicate denser and healthier vegetation.



Both treatments revealed good vegetative vigor in early December and January, and as the season progressed towards harvest in late April to early May the NDVI values declined, reflecting natural senescence. However Vitazyme values were greater near and after harvest.

Conclusions: This Chilean (Naltagua, Central Chile) walnut study, comparing two Vitazyme foliar and soil sprays with an untreated control portion of the orchard, demonstrated that Vitazyme enhanced fruit maturity and nut quality. The observed increase in hull detachment, higher kernel-to-hull ratio, larger nut size, and lighter kernel color collectively indicate accelerated and more uniform nut maturation under Vitazyme. This translates into easier harvesting and potentially better processing performance. The NDVI trend supports the hypothesis of improved physiological efficiency and post-harvest recovery under Vitazyme. Overall, these results confirm a consistent positive response of walnut trees to Vitazyme under Central Chilean conditions during the 2024-2025 season.

A walnut orchard in Central Chile was used to evaluate the effect of Vitazyme nut quality and size distribution.

Winter Wheat *with Vitazyme application*

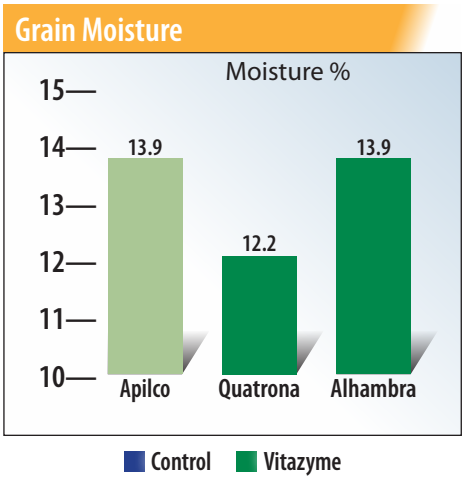
Researcher: Personnel at Niksa Agra ar, Serbia ***Research organization:*** Niksa Agra ar, Serbia
Location: Ridica and Conoplja, Serbia ***Farm cooperator:*** Stevica Rajcanji
Variety: Quatrona, Alhambra, Apilco, and Avenue ***Planting date:*** October 17 and October 23, 2024
Soil type: unknown ***Previous crop:*** unknown
Experimental design: Two locations of winter wheat were selected to evaluate the effect of Vitazyme on the yield of winter wheat. Two applications were made, one in the fall and one in the spring.

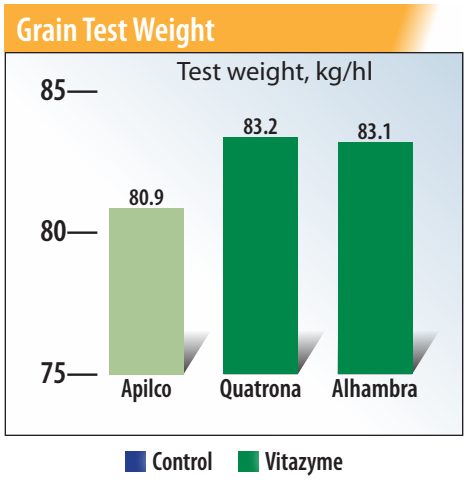
1 ***Control*** **2** ***Vitazyme***

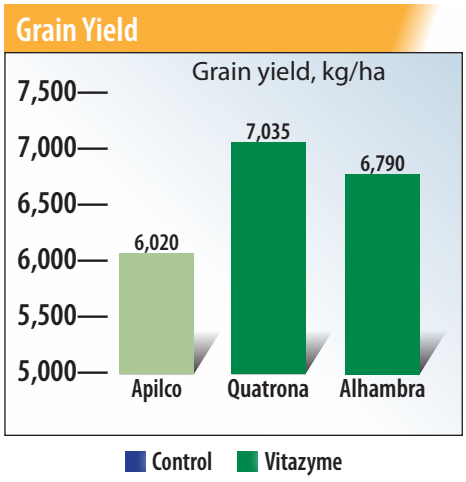
Fertilization: unknown
Vitazyme application: 1 liter/ha(13 oz/acre) sprayed on the soil four days after planting on October 27 (Ridica), or 13 days after planting on October 30 (Conoplja); 1 liter/ha (13 oz/acre) sprayed in the spring on May 13 (Ridica) or May 15 (Conoplja).
Harvest date: June 29, 2025
Grain moisture content: No significant differences in grain moisture were detected among the six treatments.

Grain test weight, and yield results:

Ridica Location						
Treatment	Variety	Grain moisture	Test weight	Impurities	Grain yield	Yield change
		%	kg/hl	%	kg/ha	kg/ha
1. Control	Apilco	13.9	80.9	2	6,020	—
2. Vitazyme	Quatrona	12.2	83.2	2	7,035	1,105 (+ 16%)
3. Vitazyme	Alhambra	13.9	83.1	2	6,790	770 (+ 13%)





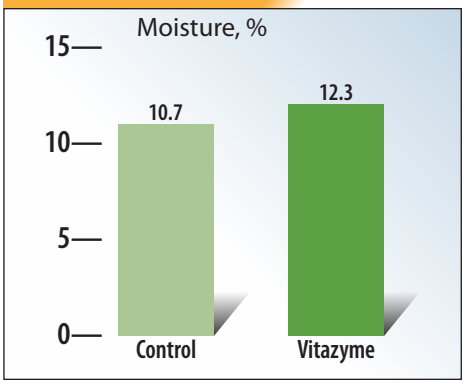


Change with Vitazyme	*Quatron*	*Alhambra*
Grain moisture	*- 1.7 % pt*	*0*
Grain test weight	*+ 2.3 kg/ha*	*+ 2.2 kg/ha*
Grain yield	*+ 16%*	*+ 13 %*

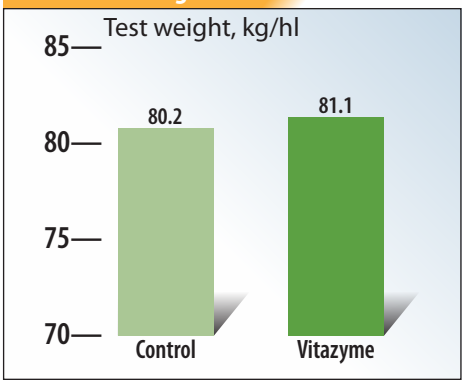
The fact that three different varieties were used in this study limits the conclusions of comparisons, but given that other field operations were the same, then Vitazyme gave substantial yield increases and improved grain density.

Concoplja Location						
Treatment	Variety	Grain moisture	Test weight	Impurities	Grain yield	Yield change
		%	kg/hl	%	kg/ha	kg/ha
1. Control	Avenue	10.7	80.2	2.2	7,110	—
2. Vitazyme	Avenue	12.3	81.1	2.9	7,570	460 (+ 6%)

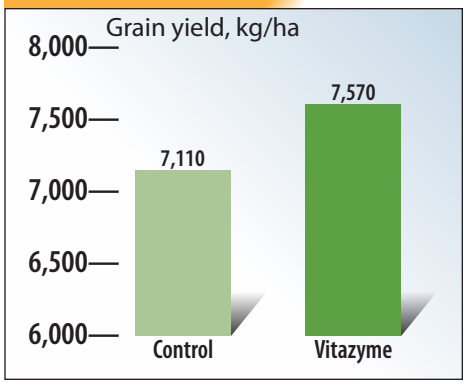
Grain Moisture



Grain Test Weight



Grain Yield



Change with Vitazyme

Grain moisture..... + 1.6 %-pt
Grain test weight ..... + 0.9 kg/hl
Grain yield..... + 6 %

Both treatments were of the same variety, so comparisons are reliable. The yield increase with Vitazyme is substantial (6%), while grain density increased slightly.

Conclusions: A winter wheat study at two locations in Serbia, utilizing two 1 liter/ha (13 oz/acre) Vitazyme applications, resulted in major yield increases with this biostimulant, of 13 to 16% at the Ridica site and 6% at the Concoplja site. Grain density was also increased with Vitazyme, by up to 2.3 kg/hl at the Ridica location. The use of different wheat varieties at the Ridia test site limits the significance of the results, but even so the comparative yield and grain density improvements are impressive. These results demonstrate the value of Vitazyme use as an agricultural management practice in Serbia.

Vitazyme Field Tests for 2025

Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York; performed by the National Academy of Agrarian Sciences of Ukraine, Institute of Feed and Agriculture of Podillia
Location: Agronomichne Village, Vinnytsia District ,Vinnytsia Region, Ukraine ***Variety:*** Pamiati Hirka, F1
Planting date: September 24, 2024 and October 24, 2024 ***Seeding rate:*** 5 million seeds/ha
Tillage: double disking to 18-20 cm, double cultivating to 3-4 cm, planting to 3 cm
Soil type: gray podzolic (2.0% organic matter) ***Previous crop:*** winter canola
Experimental design: A winter wheat field trial was arranged to compare the effect of Vitazyme, as a seed treatment, for both an optimum and a late planting date. Stem density was evaluated before harvest to evaluate plant tillering, and a final yield result was gathered as well.

1 ***Control*** (two plantings) 2 ***Vitazyme*** (two plantings)

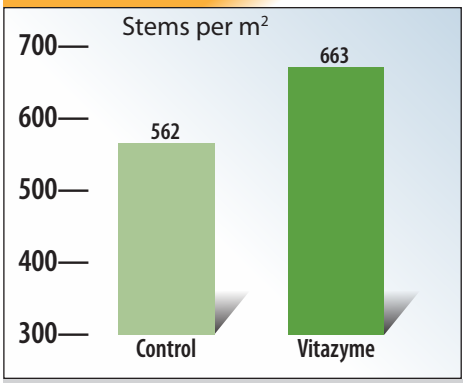
Fertilization: 62 kg/ha of N was applied as a top-dressing in the spring.

Vitazyme application: Vitazyme applied to the seeds at 1.0 liter/ha (13 oz/acre) to give that application rate. Optimum time seeds were treated on September 20, and late treated seeds on October 24.

Stem density results:

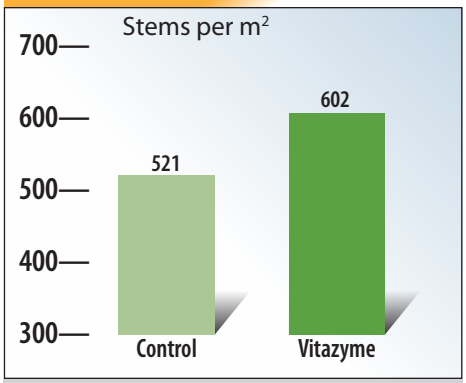
Increase in stem density with Vitazyme—optimum date: + 17%

Optimum Planting Date[1] (September 24)



[1]Sampling on July 11, 2025, at the early wax stage (BBCH 83).

Late Planting Date[1] (October 24)



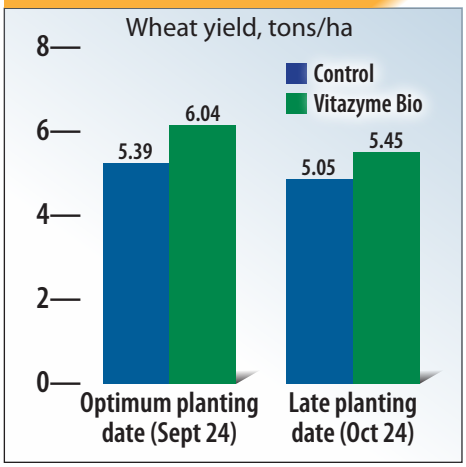
[1]Sampling on July 11, 2025, at the late dough stage (BBCH 79).

Increase in stem density with Vitazyme—late date: + 16%

Grain yield and profit results:

Treatment	Grain yield	Yield change	Added profit
	ton/ha	ton/ha	$/ha
Optimum planting date			
1. Control	5.39	—	—
2. Vitazyme	6.04	0.65 (+12%)	131
Late planting date			
1. Control	5.05	—	—
2. Vitazyme	5.45	0.40 (+8%)	79

Winter Wheat Yield



Increase in wheat yield with Vitazyme

Optimum planting date .....+12%
Late planting date .....+8%

Conclusions: This Ukrainian field scale trial evaluated the effect of a Vitazyme seed treatment (1 liter/ha or 13 oz/acre) on the growth, yield, and profitability of winter wheat near Vinnytsia. Planting at the optimum time (September 24) was compared to a late planting time (October 24). Both dates gave excellent 16 to 17% increases in stem density in July, and at harvest the optimum planting time application of Vitazyme gave a 12% yield increase, slightly higher than the 8% increase for the late planting date. Both responses were sizable, and led to profit increases of $79 to $131/ha. This seed treatment program is seen as a highly desirable addition to winter wheat programs in Ukraine.

Ukraine 2025 measurements are being taken for crop analysis for this Ukraine winter wheat trial.

Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: LLC "PC Zoria Podillia", Ziatkivtsi Village, Gaisyn District, Vinnytsia Region, Ukraine
Variety: Rumor, F2
Planting date: September 30, 2024
Seeding rate: 3 million seeds/ha
Tillage: double disking to 20-22 cm, seeding to 3 cm with a Horsch Serto planter
Soil type: gray podzolic (2.0% organic matter)
Previous crop: sunflowers
Experimental design: A wheat field was divided into an untreated control area and a Vitazyme treated area, with all other treatments being the same throughout the field. The objective of the study was to evaluate the effect of Vitazyme on winter wheat yield.

The personnel behind this Ukraine winter wheat trial are shown here. Paul Ivanicky, Plant Designs International representative in Ukraine, is on the right.

❶ *Control* ❷ *Vitazyme*

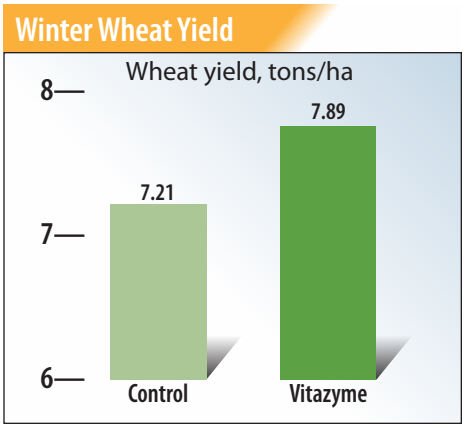
Fertilization: 3-8-11 kg/ha of N-P_2O_5-K_2O applied in-row at planting, with 85 kg/ha of N top-dressed in the spring
Vitazyme application: Vitazyme was applied to the seeds on September 10, 2024, to give a final rate of 1.0 liter/ha (13 oz/acre).

Improved early fall growth of Vitazyme treated winter wheat plants is clearly visible in this photo. The treated plants are on the left, which gave a 9% yield increase.

Yield results:

Treatment	Grain Yield	Yield increase
	tons/ha	tons/ha
1. Control	7.21	—
2. Vitazyme	7.89	0.68 (+9%)

Increase in winter wheat yield with Vitazyme: 9%



Income results: The grain increase of 0.68 ton/ha gave an additional income of $140/ha.
Conclusions: This vitazyme winter wheat trial in Ukraine, using equivalent of 1.0 liter/ha of the product on the seeds, revealed a substantial yield increase of 0.68 ton/ha (+ 9%) above the untreated control area. This yield increase resulted in $140/ha more income, showing that this agronomic addition to the farmer's program was highly effective in terms of yield and profitability.

Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: Kolyvailo Farm, Miziakivski Khutory Village, Vinnytsia District, Vinnytsia Region, Ukraine; central Ukraine (440-590 mm of rain per year)
Variety: Patras, F2
Planting date: October 7, 2024
Seeding rate: 6 million seeds/ha
Tillage: Double disking to 20-22 cm, rolling, planting at 3 cm with a Horsch Pronto planter
Previous crop: sunflowers
Soil type: gray podzolic (2.0% organic matter)
Experimental design: A wheat field was divided into an untreated control area and a Vitazyme seed-treated area to evaluate the effect of this biostimulant on the growth, grain yield, and grain quality of winter wheat.

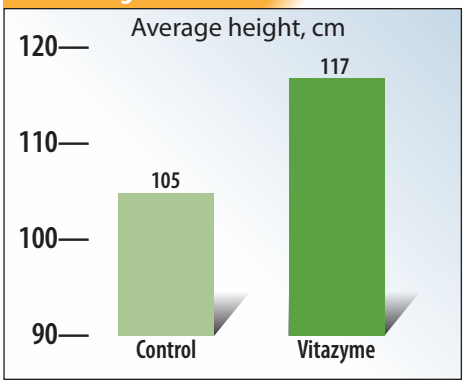
1 *Control* 2 *Vitazyme*

Fertilization: 10-10-10 kg/ha of N-P_2O_5-K_2O applied in-row at planting on October 7, 2024; 190 kg/ha of N top-dressed in the spring
Vitazyme application: seed treatment to apply an effective rate of 1.0 liter/ha (13 oz/acre). Seeds were treated two days before planting.

Growth results: On July 1, 2025, during the late milk stage (BBCH 77), measurements were made for average plant height, stem density, and spikelets per plant.

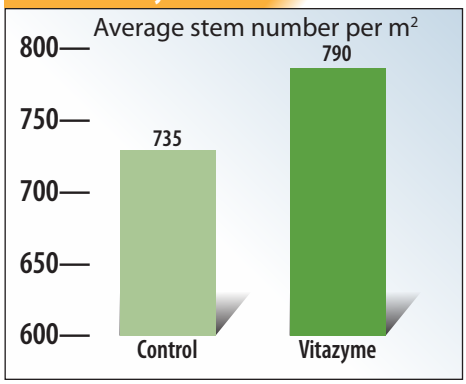
Vladimir Plotnikov discusses the Vitazyme wheat trial with the farmer in this Ukraine winter wheat study.

Plant Height



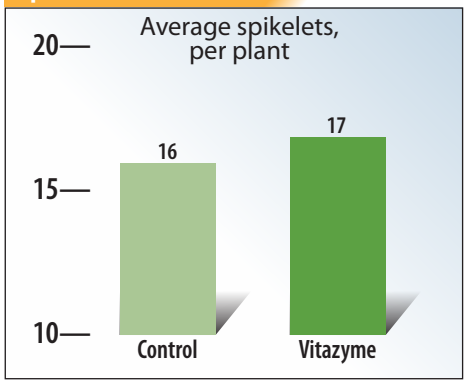
Increase in plant height with Vitazyme: 11%

Stem Density



Increase in stem density with Vitazyme: 7%

Spikelets



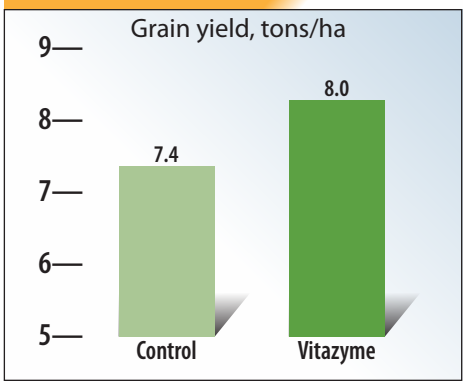
Increase in spikelets per plant with Vitazyme: 6%

Notice the considerably better density and head development for the Vitazyme treated winter wheat on the left. This gave an 8% yield increase and more gluten and protein than the untreated control.

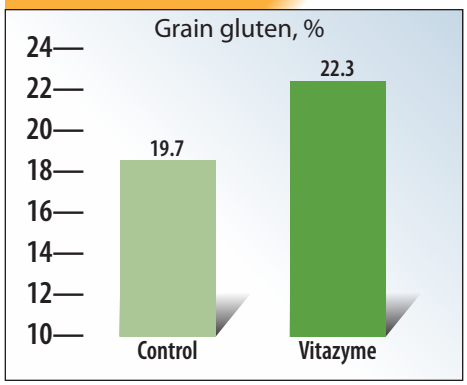
Yield and quality results:

Treatment	Grain yield	Yield change	Grain gluten	Gluten change	Crude protein	Protein change
	tons/ha	tons/ha	%	%	%	%
1. Control	7.4	—	19.7	—	10.8	—
2. Vitazyme	8.0	0.6 (+ 8%)	22.3	2.6	12.1	1.3

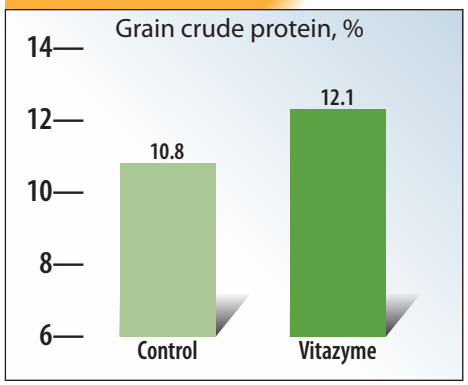
Grain Yield



Grain Gluten



Grain Crude Protein



Improvement with Vitazyme

Grain yield 8%
Grain gluten ..... 2.6 percentage points
Grain crude protein ..... 1.3 percentage points

Income results: The Vitazyme treatment resulted in an income increase of $126/ha.

Conclusions: A winter wheat field trial in central Ukraine compared a Vitazyme seed treatment (1.0 liter/ha or 13 oz/acre) with an untreated control; all other practices were the same throughout the field. Plant growth was advanced with Vitazyme for plant height (+ 11%), stem density (+7%), and spikelets per plant (+6%). These enhancements carried forward to improved grain yield (0.6 ton/ha, + 8%), as well as greater grain gluten (2.6 percentage points) and grain crude protein (1.3 percentage points), showing the excellent viability of using Vitazyme for winter wheat production in Ukraine. Extra income due to Vitazyme applications was $126/ha.

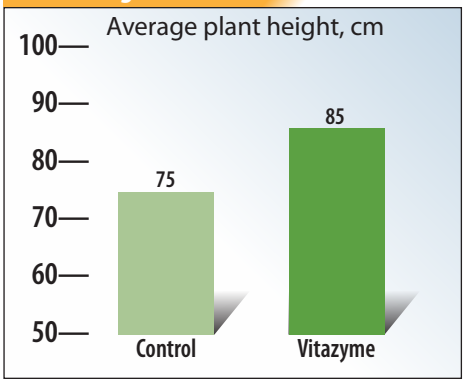
Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov ***Research organization:*** Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: Private Enterprise "Zernoplius," Rosokhovata Village, Haisyu District, Vinnytsia Region, Ukraine
Previous crop: soybeans ***Variety:*** Samurai, F1 ***Planting date:*** October 28, 2024
Seeding rate: 4.5 million seeds/ha ***Tillage:*** double disking to 20-22 cm, pre-planting cultivation to 3-4 cm
Soil type: chernozem, leached (3.5% organic matter)
Experimental design: A commercial wheat field was divided into an untreated portion and a Vitazyme treated portion to evaluate the effect of this biostimulant on the growth, yield, and quality of winter wheat. Application was made at the beginning of the tillering stage to note effects on tillering, rooting, and cold resistance.

1 ***Control*** **2** ***Vitazyme***

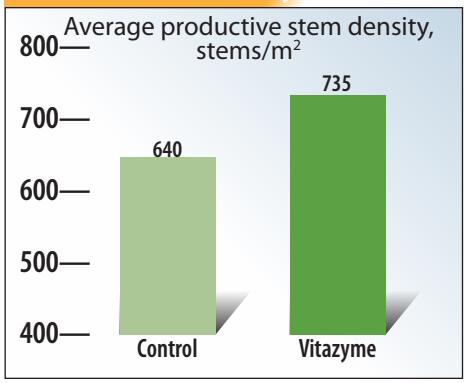
Fertilization: 10-26-26 kg/ha of N-P_2O_5-K_2O in-row at planting; 120 kg/ha of N top-dressed in the spring
Vitazyme application: 1 liter/ha (13 oz/acre) sprayed on the leaves and soil at the early tillering stage (BBCH 21) on April 5, 2025
Growing season weather: Shortly after Vitazyme application, temperatures were very cold, dropping to -2 to -5°C on April 7 to 12, during the nighttime hours. Snow fell on April 10, making the beginning of the growing season unseasonably cold.
Growth results: Measurements were made on July 15, 2025, at the late dough stage (BBCH 79), for plant height, productive stem density, and spikelet number.

Plant Height



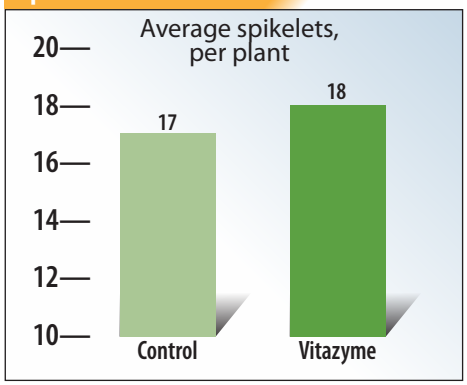
Increase in plant height with Vitazyme: 13%

Productive Stem Density



Increase in productive stem density with Vitazyme: 15%

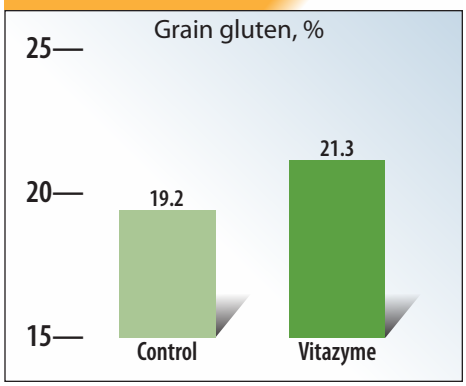
Spikelets Per Plant



Increase in spikelets per plant with Vitazyme: 6%

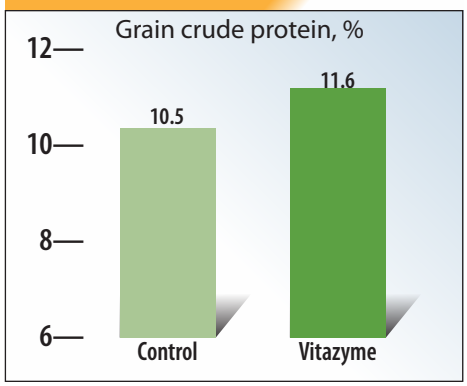
Grain quality results:

Grain Gluten



Increase in grain gluten with Vitazyme: 2.1 percentage points

Grain Crude Protein

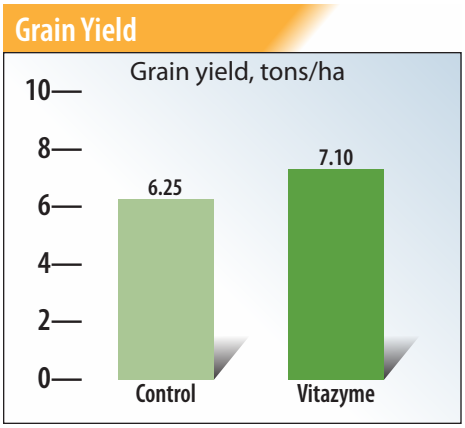


Increase in grain crude protein with Vitazyme: 1.1 percentage points

Grain yield and income results:

Treatment	Grain yield	Yield change	Profit, extra
	tons/ha	tons/ha	$/ha
1. Control	6.25	—	—
2. Vitazyme	7.10	0.85 (+ 14%)	163

Increase in grain yield with Vitazyme: 14%



Conclusions: A winter wheat split-field farm trial in Ukraine compared an untreated control against 1 liter/ha (13 oz/acre) of Vitazyme, applied at the early tillering stage (BCCH 21). This application, on April 5, happened to occur just two days before very cold nighttime temperatures, of -2 to -5°C, when some snow fell as well. The Vitazyme application relieved plant stress with its brassinosteroids and caused impressive increases in plant height (13%), productive stem density (15%), and spikelets per plant (6%). These improvements in growth gave rise to a 0.85 ton/ha (14%) yield increase, while at the same time improved grain gluten by 2.1 percentage points and grain crude protein by 1.1 percentage points. These results indicate how effectively Vitazyme can help winter wheat overcome cold stress through its brassinosteroid content. Income was enhanced by $163/ha in this trial.

Vitazyme Field Tests for 2025

Winter Wheat *with Vitazyme application*

Here is the Asko humate treated portion of the winter wheat field, which produced less than the Vitazyme treatment alongside it.

Winter wheat treated with Vitazyme performed very well in this Ukraine trial, outperforming a competitor product, Asko humate, by 8%.

Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: LLC "SP Zoria-2010", Vyhoda Village, Odessa District, Odessa Region, Ukraine; southern Ukraine, precipitation 270-350 mm annually.
Variety: Pokrovska, F1 ***Planting date:*** September 23, 2024 ***Seeding rate:*** 3.2 million seeds/ha
Tillage: disking to 18-20 cm, direct seeding to 3 cm
Previous crop: winter canola ***Soil type:*** southern chernozem (3.0% organic matter)
Experimental design: A commercial wheat field was utilized to evaluate the effect of Vitazyme biostimulant — as compared to a humate product — on the yield of the crop, when applied as a seed treatment. All practices were the same across the test field except the humate and Vitazyme applications.

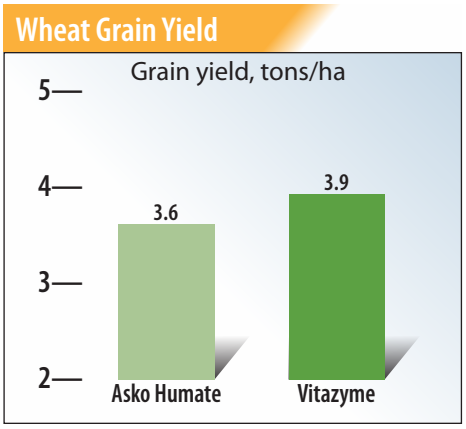
❶ ***Asko Humate*** ❷ ***Vitazyme***

Fertilization: 10-10-7 kg/ha of N-P_2O_5-K_2O were applied in-furrow at fall planting, and 50 kg/ha of N was top-dressed in the spring.
Vitazyme application: 1 liter/ha (13 oz/acre) as a seed treatment, the seeds being treated on September 21, 2024
Asko Humate application: 1.0 liter/ha (13 oz/acre), applied on the seeds on September 21, 2024

Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
1. Asko Humate	3.6	—
2. Vitazyme	3.9	0.3 (+ 8%)

Increase in wheat grain yield with Vitazyme vs. Asko Humate: 8%



Income results: The Vitazyme treatment generated $63/ha more income than did the Asko Humate treatment.
Conclusions: A farm-scale winter wheat trial was conducted in Ukraine to examine the effect of Vitazyme and Asko Humate, both applied to the seeds at 1 liter/ha (13 oz/acre), on the grain before planting. Vitazyme produced a 0.3 ton/acre yield advantage over the humate, which generated $63/ha greater income for the farmer. There was no control in this study which received neither product, but the results show a relative comparison of the two products.

Vitazyme Field Tests for 2025

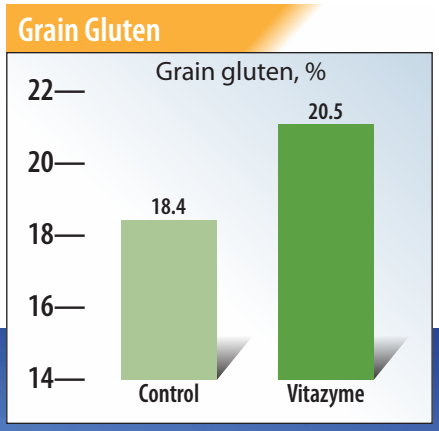
Winter Wheat *with Vitazyme application*

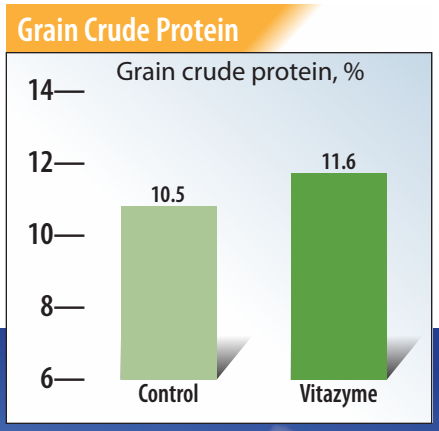
Researcher: V. V. Plotnikov
Research organization: Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York
Location: Farm "Persei Agro," Koniushky Village, Ivano-Frankivsk District, Ivan-Frankivsk Region, Ukraine.
Previous crop: winter canola ***Variety:*** RGT Reform, F2 ***Planting date:*** September 26, 2024
Seeding rate: 3.3 million seeds/ha
Tillage: disking to 8-10 cm, subsoiling to 25 cm, and pre-planting cultivation to 3-4 cm
Soil type: leached chernozem, (3.2% organic matter)
Experimental design: A winter wheat field was divided into an untreated control portion and a Vitazyme treated area, with the Vitazyme applications split into two parts. The trial experienced very cold temperatures the second half of May, enabling the observation of effects of Vitazyme on cold temperature tolerance. Yield and grain quality measurements were obtained.

❶ *Control* ❷ *Vitazyme*

Fertilization: 5-20-0 kg/ha of N-P_2O_5-K_2O in-furrow at planting, and 215 kg/ha of N and 24 K/ha of S top-dressed in the spring
Vitazyme application: a split application: 0.6 liter/ha (8 oz/acre) foliar/soil sprayed at stem elongation (BBCH 37) on May 20, 2025, and 04 liter/ha (5 oz/acre) foliar/soil sprayed at early flowering (BBCH 61) on June 5, 2025.
Growing season weather: The last half of May saw temperatures that were 5.4°C below normal.
Grain quality results:

Grain yield results:





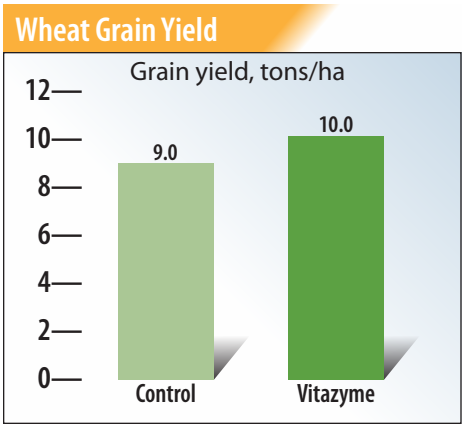
Increase with Vitazyme

Grain gluten .... 2.1 percentage points
Grain crude protein ....1.1 percentage points

This winter wheat trial in Ukraine produced an excellent 11% yield increase while raising the gluten content by 2.1 percentage points, and the crude protein level by 1.1 percentage points.

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
1. Control	9.0	—
2. Vitazyme	10.0	1.0 (+ 11%)

Increase in wheat grain yield with Vitazyme: 11%



Income results: The Vitazyme treatment resulted in $196/ha greater income.

Conclusions: This conventional field winter wheat trial in Ukraine, comparing a split application of Vitazyme — at stem elongation (BBCH 37) and early flowering (BBCH 61) — with an untreated control showed that Vitazyme increased the yield by 10 ton/ha, an 11% increase; this increase translated to $196/ha greater income. In addition, grain gluten and crude protein were both increased by 2.1 and 1.1 percentage-points, respectively. These results indicate the excellent utility of incorporating Vitazyme into winter wheat programs in Ukraine.