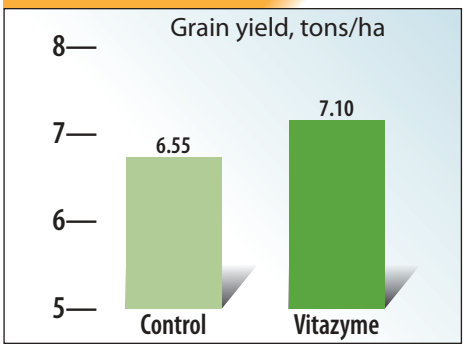
Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Plant Designs, Inc., Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine
Location: Kolyvailo Farm, Vinnytsia District, Vinnytsia Region, Miziakivski Hutory Village, Ukraine
Variety: Midas, third generation ***Planting date:*** October 10, 2017 ***Previous crop:*** sunflowers
Soil type: gray podzolic (humus = 2.0%) ***Planting rate:*** 6 million seeds/ha
Field preparation: disking to 6-8 cm, plowing to 20-22 cm, cultivation to 4-5 cm
Experimental design: A winter wheat field was divided into Vitazyme treated and untreated areas to determine the effect of this product on the yield, quality, and profitability of the crop.

❶ ***Control*** ❷ ***Vitazyme***

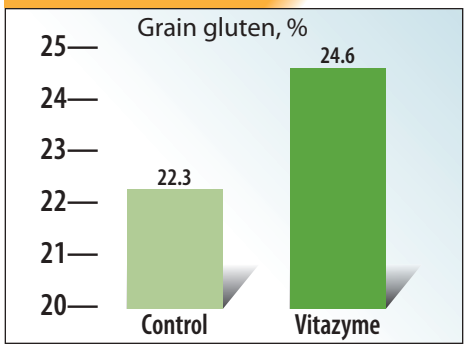
Fertilization: 15-40-40 kg/ha of N-P_2O_5-K_2O at fall sowing; 186-48 kg/ha of N-S in the spring
Vitazyme application: 1 liter/ha on October 8, 2017, sprayed over the soil
Yield and grain quality results: The harvest date is unknown.

Grain Yield



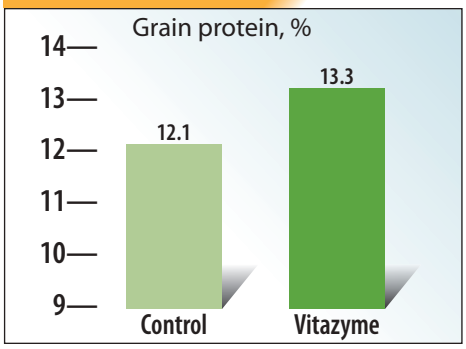
Increase in grain yield with Vitazyme: 8%

Grain Gluten



Increase in grain gluten with Vitazyme: 2.3 %-points

Grain Protein



Increase in grain proteins with Vitazyme: 1.2 %-points

In this random plant sampling, Vitazyme is shown to promote rooting and top growth, leading to a higher yield.

Income results: The improvement in yield and grain quality provided an extra $129/ha income for the farmer.

Conclusions: A winter wheat study in central Ukraine, using only one 1 liter/ha application of Vitazyme, showed an 8% increase in grain yield, along with significant increases in grain gluten (2.3 percentage points) and grain protein (1.2 percentage points). These improvements provided $129/ha more income, and proved the considerable efficacy of this product for improving wheat production in central Ukraine.

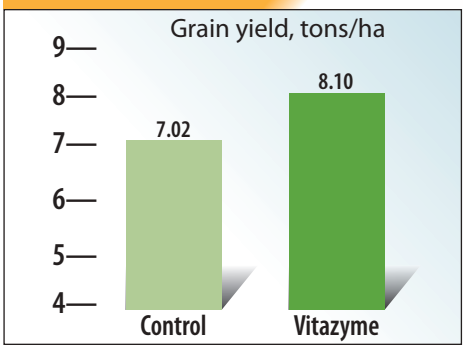
Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Plant Designs, Inc., Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine
Location: Bilgorod-Dnistrovskii District, Odessa Region, Petrivka Village, LTD Spelta, Ukraine
Variety: Midas, elite ***Planting date:*** September 21, 2017 ***Previous crop:*** winter canola
Soil type: typical chernozem (humus = 4.1%) ***Planting rate:*** 5 million seeds/ha
Field preparation: disking to 6-8 cm, disking to 14-16 cm, cultivation to 4-5 cm
Experimental design: A winter wheat field in southern Ukraine was divided into Vitazyme treated and untreated areas, and compared to determine the effect of this product on the yield, quality, and profitability of the biostimulant.

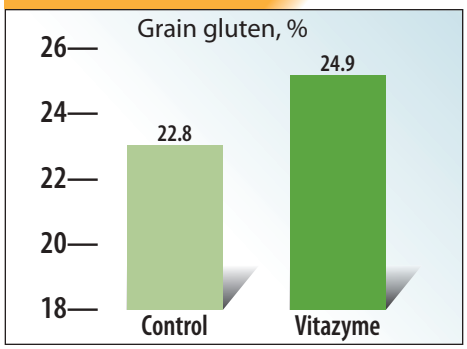
❶ ***Control*** ❷ ***Vitazyme***

Fertilization: 18-18-18 kg/ha of N-P_2O_5-S at disking; 20 kg/ha at planting; 170-36 kg/ha N-S in the spring
Vitazyme application: (1) 0.5 liter/ha sprayed on the leaves and soil at the 3-leaf stage on October 26, 2017; (2) 0.5 liter/ha sprayed on the leaves and soil at tillering on April 16, 2018
Yield and quality results:

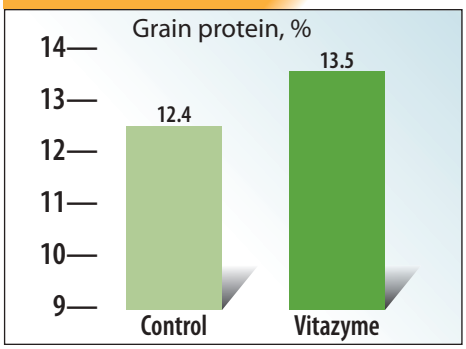
Grain Yield



Grain Gluten



Grain Protein



A Vitazyme seed treatment for wheat (left-hand plants) stimulates germination and seedling development, an effect that compounds during the growing season as can be seen here.

Increase with Vitazyme

Grain yield ..... 15 %
Grain gluten..... 2.1 %-points
Grain crude protein ..... 1.1 %-points

Income results: An increase in yield of 2.1 tonnes/ha, coupled with an improvement in crude protein and gluten, resulted in $243/ha more income.

Conclusions: This southern Ukraine winter wheat trial, using two 0.5 liter/ha Vitazyme applications, resulted in an excellent 15% yield increase, along with good increases in gluten and crude protein, with a 1.1 percentage point improvement for protein. These increases produced $243/ha more income for the farmer and reveal the great efficacy of this program for wheat farmers in Ukraine.

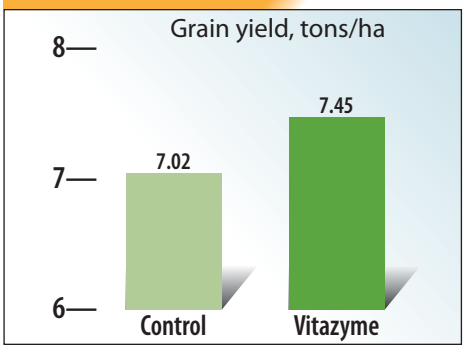
Winter Wheat *with Vitazyme application*

Researcher: V. V. Plotnikov
Research organization: Plant Designs, Inc., Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine
Location: Bilgorod-Dnistrovskii District, Odessa Region, Petrivka Village, LTD Spelta, Ukraine
Variety: Balaton, elite ***Planting date:*** September 21, 2017 ***Previous crop:*** winter canola
Soil type: typical chernozem (humus = 4.1%) ***Planting rate:*** 5 million seeds/ha
Field preparation: disking to 6-8 cm, disking to 14-16 cm, cultivation to 4-5 cm
Experimental design: A winter wheat field in southern Ukraine was divided into Vitazyme treated and untreated areas to evaluate the effect of this product on the yield and quality, as well as profitability, for winter wheat.

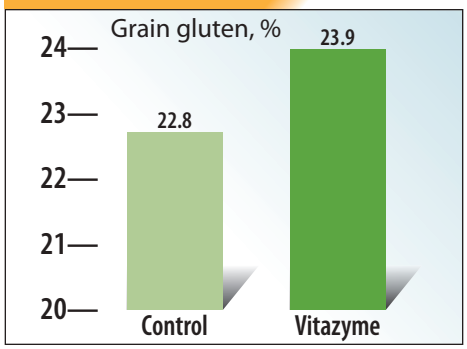
❶ ***Control*** ❷ ***Vitazyme***

Fertilization: 18-18-18 kg/ha of N-P_2O_5-S at disking; 20 kg/ha P_2O_5 at planting; 170-36 kg/ha N-S in the spring
Vitazyme application: 0.5 liter/ha sprayed on the leaves and soil in the fall of October 26, 2017
Income results: The improvement of grain yield and quality resulted in $95/ha added income.
Yield and quality results:

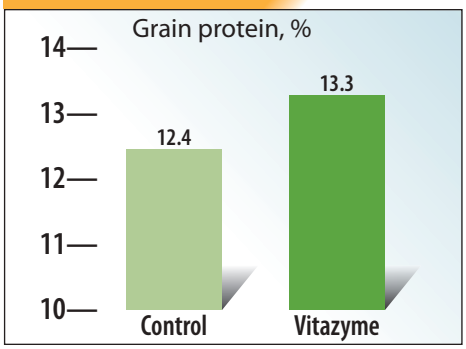
Grain Yield



Grain Gluten



Grain Protein



Increase with Vitazyme

Grain yield .....6 %
Grain gluten.....1.1 %-points
Grain crude protein .....0.9 %-point

Conclusions: This winter wheat trial in southern Ukraine, using a single spring application of Vitazyme at only 0.5 liter/ha, resulted in a respectable yield increase of 6%, while boosting grain gluten and crude protein by 1.1 and 0.9 percentage points, respectively. These results show the excellent utility of this program for Ukrainian wheat growers.

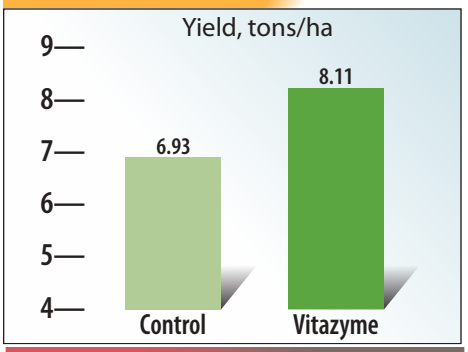
Winter Wheat *with Vitazyme application*

Researcher: Vadim Plotnikov
Research organization: "Dashkivtsi", Ukraine, Plant Designs, New York, USA, and Agro Expert International, Ukraine
Location: Lityn District, Vinnytsia Region, Dashkivtsi Village, Ukraine
Variety: Mulan (generation 2)
Seeding rate: 6 million seeds/ha
Planting date: October 3, 2016
Previous crop: soybeans
Soil type: gray-brown podzolic; humus=2.0%
Soil preparation: disking to 20-22 cm, cultivation to 14-15 cm, pre-sowing cultivation to 5-6 cm
Experimental design: A winter wheat field was divided into a Vitazyme treated area and a untreated control area to determine the effect of this product on grain yield and protein content.

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

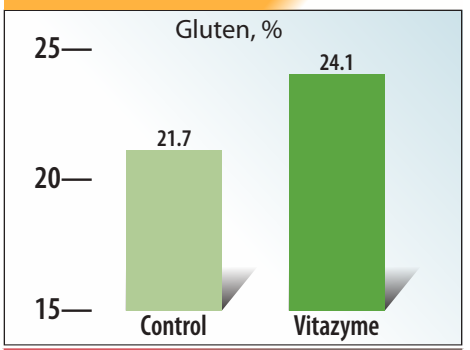
Fertilization: 51-52-52-36 kg/ha of N-P_2O_5-K_2O -S broadcast during fall cultivation; 150 kg/ha of N applied in the spring
Vitazyme application: 1 liter/ha sprayed on the leaves and soil on May 3, 2017
Growing season weather: dry
Yield and quality results:
Income results: At a price of about $190.68/ton, the added income from the extra 17% grain produced is $225.
Conclusions: A winter wheat field-scale trial in central Ukraine, using 1 liter/ha foliar applied in the spring, produced an excellent 1.18 ton/ha (17%) yield increase compared to the untreated control. Moreover, grain quality improved, with 24 percentage points more gluten and 1.3 percentage points more crude protein. As a result, the return to the farmer for this one liter application was an impressive $225/ha, showing the great efficacy of this program for wheat farmers in Unkraine.

Grain Yield



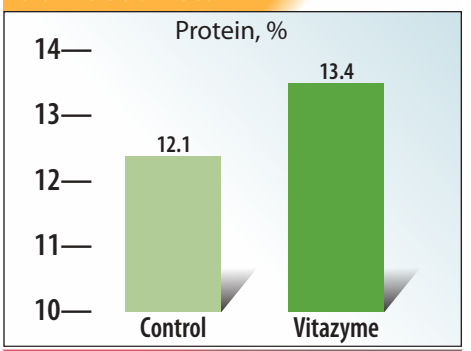
Increase in grain yield with Vitazyme: 17%

Grain Gluten



Increase in grain gluten with Vitazyme: 2.4 percentage points

Grain Crude Protein



Increase in grain crude protein with Vitazyme: 1.3 percentage points

Winter Wheat *with Vitazyme application*

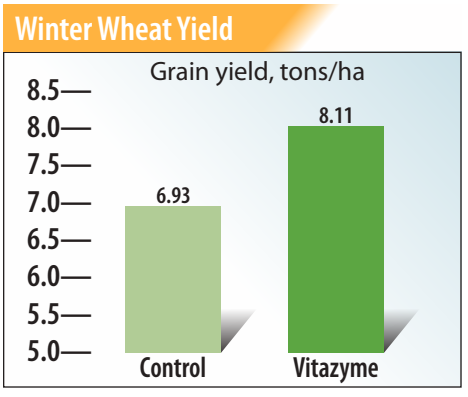
Researcher: Vadim Plotnikov
Research organization: LLC "Dashkivtsi"
Location: Litinsky District, Vinnitsia Region, Dashkivtsi Village
Variety: Mulan (generation 2)
Seeding rate: 6 million seeds/ha
Planting date: October 3, 2016
Previous crop: soybeans
Soil type: ashy gray, humus=2.0%
Seedbed preparation: disking to 20-22 cm, cultivation to 14-15 cm, and a pre-planting cultivation to 5-6 cm
Experimental design: A field of winter wheat was divided into an untreated control area and a Vitazyme treated portion to evaluate the effect of this treatment on the yield and quality of grain.

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

Fertilization: (1) A pre-plant application of 51-52-52-36 kg/ha of N-P_2O_5-K_2O-S, (2) 150 kg/ha of N broadcast in the spring.
Vitazyme application: 1 liter/ha foliar sprayed on May 3, 2017
Growing season weather: dry
Yield results:

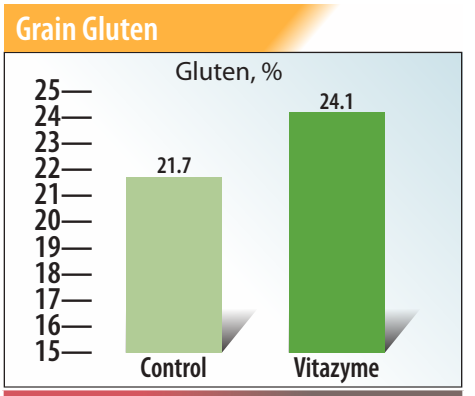
Treatment	Grain yield	Yield change
	tons/ha	ton/ha
1. Control	6.93	—
2. Vitazyme	8.11	1.18 (+17%)

Yield increase of winter wheat with Vitazyme: 17%

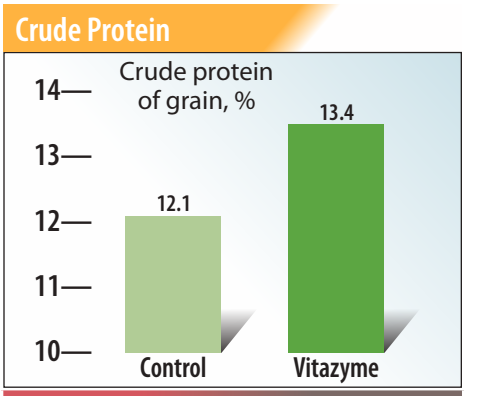


Vitazyme applied to winter wheat in Ukraine produced an excellent yield response of 17%, while increasing grain protein as well.

Grain quality results:



Grain gluten increase in winter wheat with Vitazyme: 2.4% percentage points



Grain protein increase in winter wheat with Vitazyme: 1.3% percentage points

Income results: The yield improvement in this wheat study caused an income increase of $225/ha.
Conclusions: This winter wheat study in Ukraine, using only one application of 1 liter/ha on May 3, produced an excellent yield increase of 17%, while in addition improving the gluten and crude protein by 2.4 and 1.3 percentage points, respectively. Besides, these improvements led to an income increase of $225/ha, proving how effective this program is for wheat growers in Ukraine.

Winter Wheat *with Vitazyme application*

Researcher: Vadim Plotnikov
Research organization: "Oskar" Farm, Ukraine, Plant Designs, New York, USA, and Agro Expert International, Ukraine
Location: Velyka Mikhailivka District, Odessa Region, Kardamychevo Village, Ukraine
Variety: Cubus (generation 3)
Seeding rate: 4.5 million seeds/ha
Planting date: September 21, 2016
Previous crop: sunflowers
Soil type: typical Chernozem; humus=4.3%
Soil preparation: disking to 6-8 cm, harrowing to 4-5 cm
Experimental design: A winter wheat field was divided into Vitazyme treated and untreated control areas to determine the efficacy of this product in promoting yield and grain quality increases.

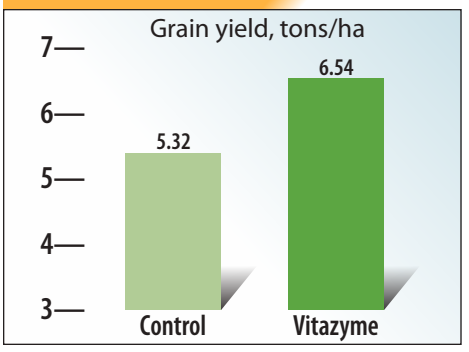
1 ***Control*** **2** ***Vitazyme***

Fertilization: 10-26-26 kg/ha of N-P_2O_5-K_2O starter at fall planting, and 65-35 kg/ha of N-S broadcast in the spring.
Vitazyme application: 0.5 liter/ha sprayed on the leaves and soil in the fall (October 26, 2016), and 0.8 liter/ha sprayed on the leaves in the spring (April 10, 2017)
Growing season weather: dry
Yield and grain quality results:

Treatment	Grain yield	Yield change
	tons/ha	ton/ha
1. Control	5.32	—
2. Vitazyme	6.54	1.22 (+23%)

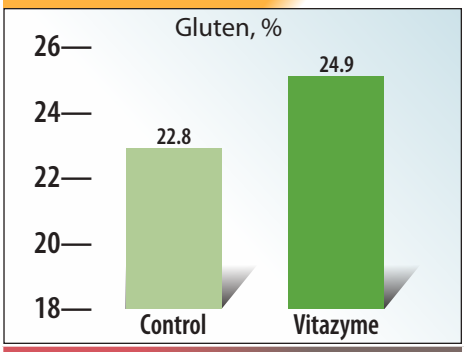
Increase in grain yield with Vitazyme: 34%

Winter Wheat Yield



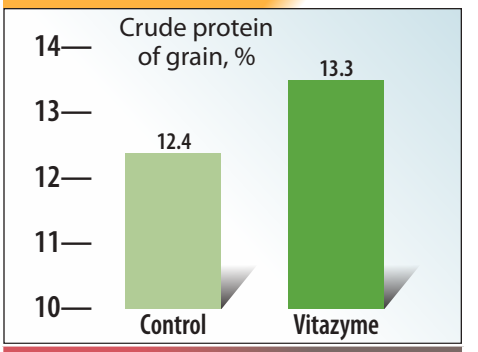
Young wheat plants from Ukraine reveal much better early growth when treated with Vitazyme on the seeds. The usual rate applied is 1 liter/ton of seed.

Grain Gluten



Increase in grain gluten with Vitazyme: 2.1 percentage points

Grain Crude Protein



Increase in grain gluten with Vitazyme: 0.9 percentage point

Income results: At a price of $190.98/ton for winter wheat, the added 1.22 tons/ha gave an additional $233/ha income.
Conclusions: A southern Ukranian full-field study using Vitazyme plant and soil supplement, at 0.5 and 0.8 liter/ha in the fall and spring, respectively, resulted in an excellent yield gain of 1.22 tons/ha (23%) compared to the untreated control. Grain gluten also increased (2.1 percentage points), as did crude protein (0.9 percentage point). Farmer income rose by $233/ha, showing the great utility of this program for Ukrainian wheat farmers.

Winter Wheat *with Vitazyme application*

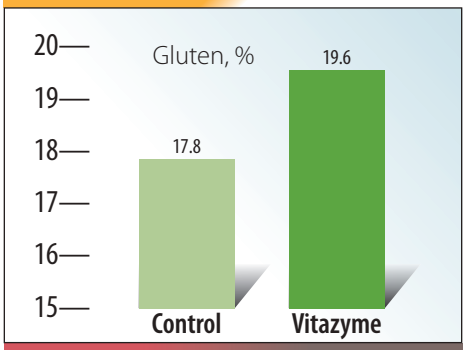
Researcher: V. V. Plotnikov
Research institution: Agro Expert International, Vinnytsya, Ukraine
Location: Farming Enterprise Kolyvailo, Miziakivs'ki Hutory Village, Vinnytsya Region, Ukraine
Variety: Acteur
Planting date: October 2, 2015
Seeding rate: 6 million/ha
Soil type: gray podzolic (2.0% organic matter)
Cultivation: disking to 6-8 cm, plowing to 20-22 cm, and two cultivations to 4-5 cm
Rainfall: 500-550 mm
Experimental design: A winter wheat field was divided into a Vitazyme treated and untreated area, with the objective of determining the effect of this product on the yield and quality of the grain.

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

Fertilization: at planting, 30-30-30 kg/ha of N-P_2O_5-K_2O in-row; in the spring, 120 kg/ha of N
Vitazyme application: 1.0 liter/ha on the seeds before planting, on September 30, 2015

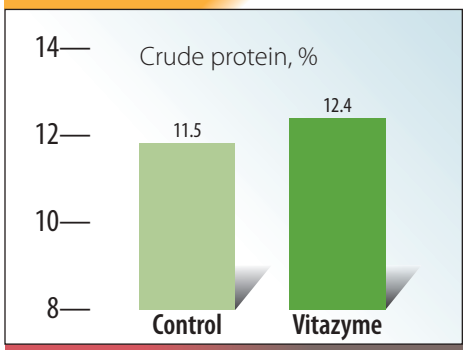
Quality results:

Grain Gluten



Increase in grain gluten: 1.8%-points

Crude Protein



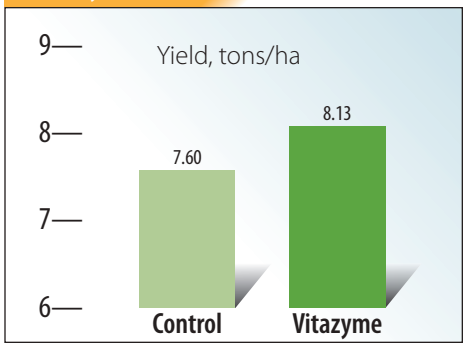
Increase in crude protein: 0.9%-point

Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	7.60	—
Vitazyme	8.13	0.53 (+7%)

Increase in grain yield with Vitazyme: 7%

Grain yield



Income results: Vitazyme increased net profit by 93.2 USD/ha.

Conclusions: This Vitazyme seed treatment trial in Ukraine showed that only 1 liter/ton of seed produced a 7% yield increase, while improving grain gluten and protein by 1.8 and 0.9 percentage points, respectively. Profits were substantially increased, showing the viability of this product for winter wheat production in central Ukraine.

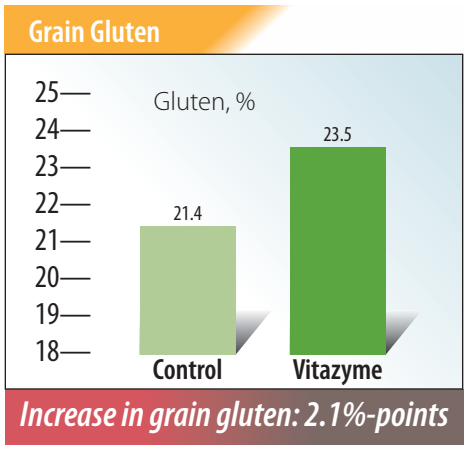
Winter Wheat *with Vitazyme application*

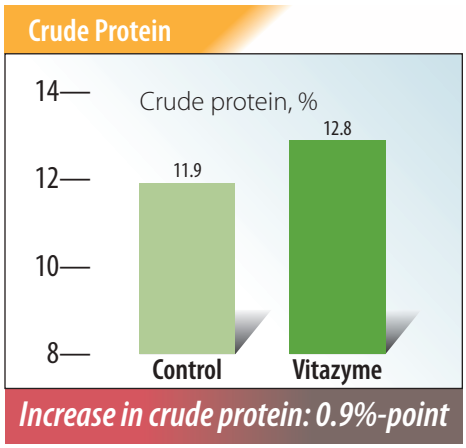
Researcher: V. V. Plotnikov
Research institution: Agro Expert International, Vinnytsya, Ukraine
Location: Private Agricultural Enterprise Polianka, Polianka Village, Harbuzyn District, Mykolayiv Region, Ukraine.
Variety: Zolotokolosa, first reproduction
Planting date: September 25, 2015
Seeding rate: 5.5 million/ha
Previous crop: peas
Soil type: gray podzolic (3.2% organic matter)
Cultivation: disking to 6-8 cm, plowing to 20-22 cm, and one cultivation to 4-5 cm
Rainfall: 300-350 mm
Experimental design: A winter wheat field was divided into a Vitazyme treated and untreated area, with the objective of determining the effect of this product on the yield and quality of the grain.

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

Fertilization: at planting, 16-16-16 kg/ha of N-P_2O_5-K_2O in-row; in the spring, 120 kg/ha of N
Vitazyme application: 1.0 liter/ton on the seeds before planting, on September 21, 2015

Quality results:

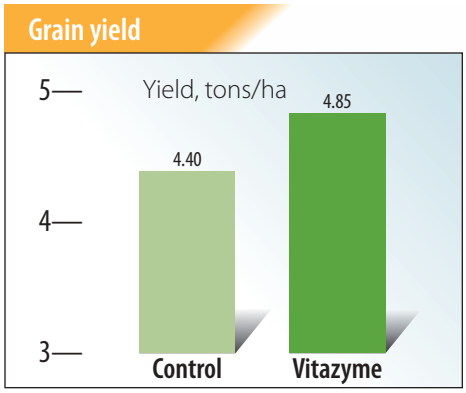




Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	4.40	—
Vitazyme	4.85	0.45 (+10%)

Increase in grain yield with Vitazyme: 10%



Income results: Vitazyme increased net profit by 78.3 USD/ha.

Conclusions: This Vitazyme trial using a 1.0 liter/ton seed treatment in Ukraine showed that this minimal amount of product produced a 10% yield increase, while improving grain gluten and protein by 2.1 and 0.9 percentage points, respectively. Profits were substantially increased, showing the great value of this product for winter wheat production in southern Ukraine on podzolic Chernozem soils.

Winter Wheat *with Vitazyme application*

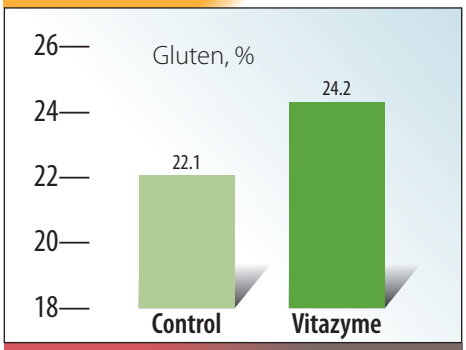
Researcher: V. V. Plotnikov
Research institution: Agro Expert International, Vinnytsya, Ukraine
Location: Agricultural L. L. C. Rozkishna, Novosilka Village, Holovanivs'kyl District, Kirovohrad Region, Ukraine.
Variety: Zolotokolosa, first reproduction
Planting date: September 28, 2015
Seeding rate: 5.5 million/ha
Previous crop: soybeans
Soil type: podzolic Chernozem (3.1% organic matter)
Cultivation: plowing to 20-22 cm, and two cultivations to 4-5 cm
Rainfall: 500-550 mm
Experimental design: A winter wheat field was divided into a Vitazyme treated and untreated area, with the objective of determining the effect of this product on the yield and quality of the grain.

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

Fertilization: at planting, 15-15-15 kg/ha of N-P_2O_5-K_2O in-row; in the spring, 105 kg/ha of N
Vitazyme application: 1.0 liter/ton on the seeds before planting, on September 23, 2015

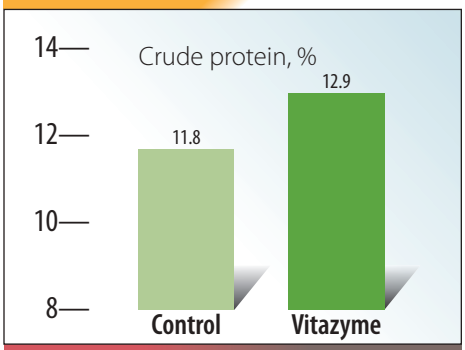
Quality results:

Grain Gluten



Increase in grain gluten: 2.1%-points

Crude Protein



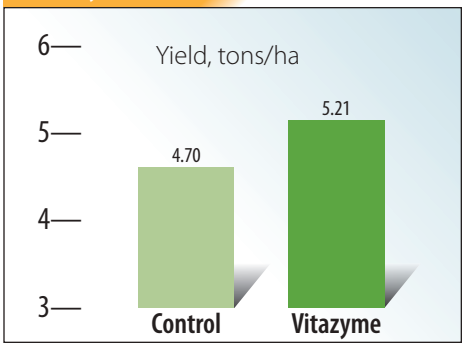
Increase in crude protein: 1.1%-point

Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	4.70	—
Vitazyme	5.21	0.51 (+11%)

Increase in grain yield with Vitazyme: 11%

Grain yield



Income results: Vitazyme increased net profit by 89.5 USD/ha.

Conclusions: This Vitazyme seed treatment trial in Ukraine showed that only 1 liter/ton of seed produced an 11% grain yield increase, while improving grain gluten and protein by 2.1 and 1.1 percentage points, respectively. Profits were substantially increased, showing the viability of this product for winter wheat production in central Ukraine on a high organic matter podzolized Chernozem soil.

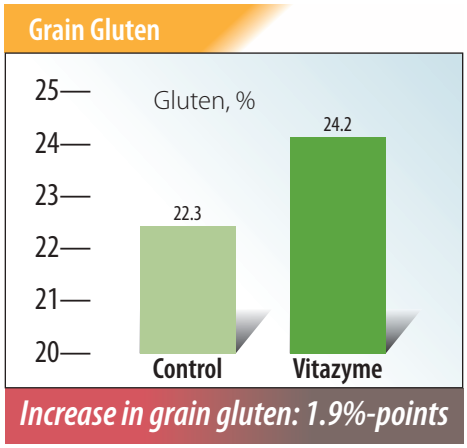
Winter Wheat *with Vitazyme application*

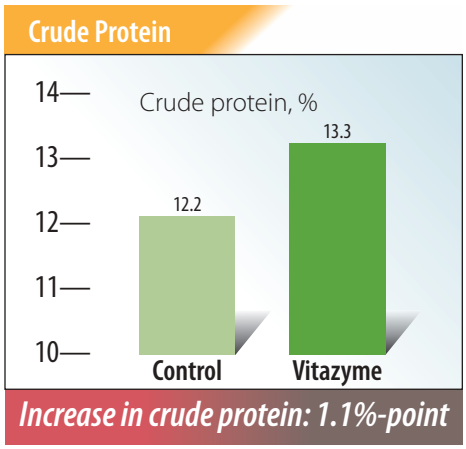
Researcher: V. V. Plotnikov
Research institution: Agro Expert International, Vinnytsya, Ukraine
Location: Private Enterprise Urozhay, Volodymyrivka Village, Domanivs'Kyi District, Mykolayiv Region, Ukraine.
Variety: Pylypivka, selected grain
Planting date: September 30, 2015
Seeding rate: 5.5 million/ha
Previous crop: sunflowers
Soil type: podzolic Chernozem (3.3% organic matter)
Cultivation: disking to 6-8 cm, plowing to 20-22 cm, and one cultivation to 4-5 cm
Rainfall: 300-350 mm
Experimental design: A winter wheat field was divided into a Vitazyme treated and untreated area, with the objective of determining the effect of this product on the yield and quality of the grain.

❶ ***Control*** ❷ ***Vitazyme***

Fertilization: at planting, 30-30-30 kg/ha of N-P_2O_5-K_2O in-row; in the spring, 120 kg/ha of N
Vitazyme application: 1.0 liter/ton on the seeds before planting, on September 25, 2015

Quality results:

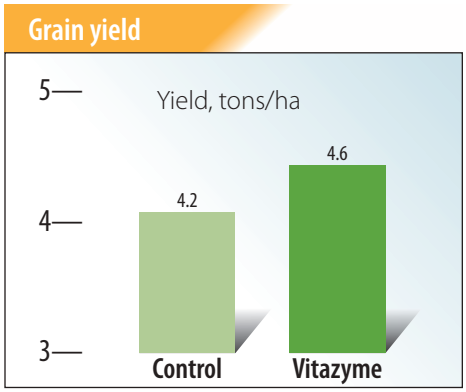




Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	4.2	—
Vitazyme	4.6	0.4 (+10%)

Increase in grain yield with Vitazyme: 10%



Income results: Vitazyme increased net profit by 69.0 USD/ha.

Conclusions: A Vitazyme seed treatment trial in southern Ukraine showed that only 1 liter/ton of seed produced a 10% yield increase, while improving grain gluten and protein by 1.9 and 1.1 percentage points, respectively. Profits were also increased, showing the viability of this product for winter wheat production in southern Ukraine on high organic matter soils.

Winter Wheat *with Vitazyme application*

Untreated winter wheat at Jordan Farms is shown to be much shorter and less dense in growth than the treated wheat in the accompanying photo.

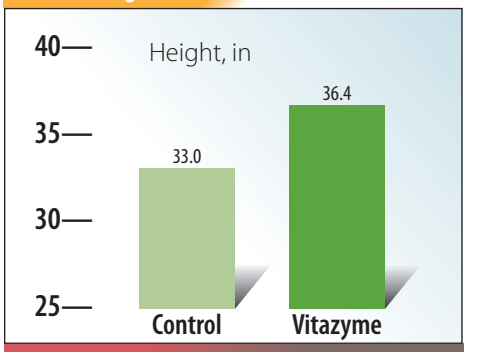
Vitazyme treated soft white winter wheat (at tillering) is much thicker and taller than the untreated control, and yielded 6% more grain.

Researchers: Jacob Hesseltine and Heba Khalid
Research organization: Vital Grow Distribution LLC, Waterville, Washington
Farmer: Jordan Farms
Location: Waterville, Washington
Variety: Eltan soft white winter wheat
Planting date: August 25, 2014
Seeding rate: 45 lb/acre
Seedbed preparation: subsoiling, harrowing, disking, plowing cultivation, weeding
Previous crop: fallow
Soil type: clayey
Experimental design: Two adjoining and nearly identical fields, each having 155 acres with uniform past management history, were selected to compare the yield and quality of winter wheat as affected by Vitazyme. One field received Vitazyme and the other served as an untreated control.

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

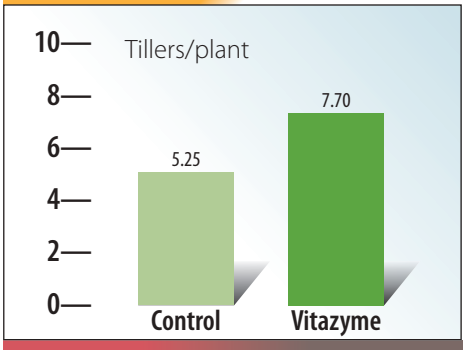
Fertilization: 60 lb/acre of nitrogen in July of 2014
Vitazyme application: 12.4 oz/acre sprayed on the leaves and soil with a 90-foot boom sprayer the last part of April, along with Olympus Flex Broadleaf Herbicide, at the 3 to 5-tiller stage
Growing season weather: good growing conditions with little winter snow, and only 6 inches of precipitation from January to harvest; extreme heat in June and July to affect plant development.
Growth observations: The growers noted visible differences in growth during the growing season, with greater plant mass and more stems in the Vitazyme treatment, plus more stems and thicker stubble noted in the treated field after harvest.
Harvest dates: July 22 and 23, 2015
Plant parameter results: On July 12, 20 typical plants from each field were harvested, and parameters were measured for each one and averaged.

Plant Height



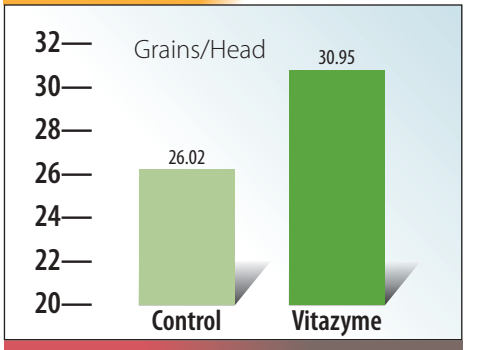
Increase in plant height with Vitazyme: 10%

Tillers Per Plant



Increase in tillers per plant with Vitazyme: 47%

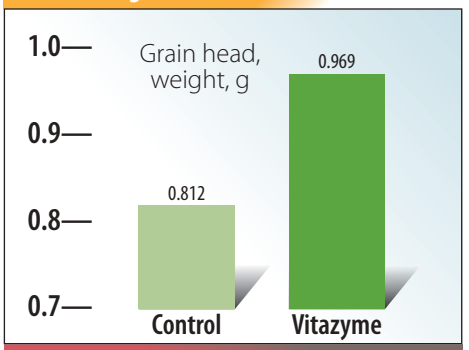
Grains Per Head



Increase in grain per head with Vitazyme: 19%

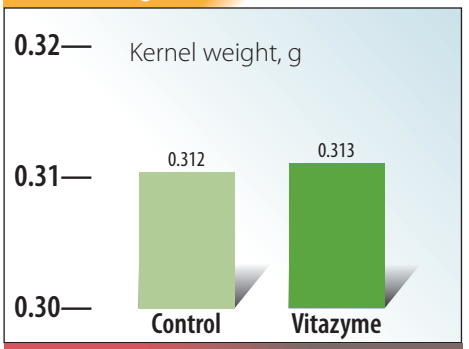
Winter Wheat *with Vitazyme application cont.*

Grain Weight Per Head



Increase in grain weight/head with Vitazyme: 19%

Kernel Weight

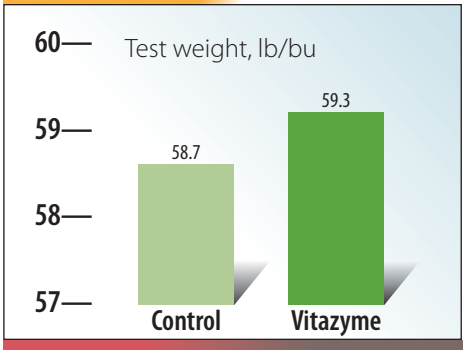


Increase in kernel weight with Vitazyme: 0%

All plant parameters but kernel weight increased with Vitazyme. Kernel weight is difficult to change.

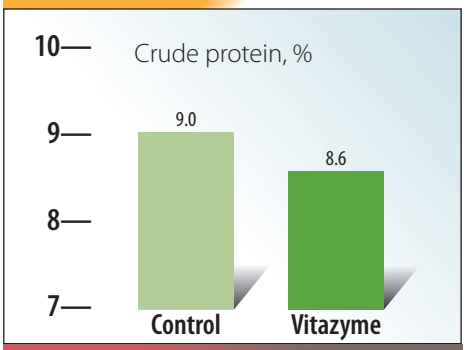
Grain quality results: At harvest, the grain from each field was weighed and sampled separately.

Test Weight



Increase in test weight with Vitazyme: 1%

Grain Protein



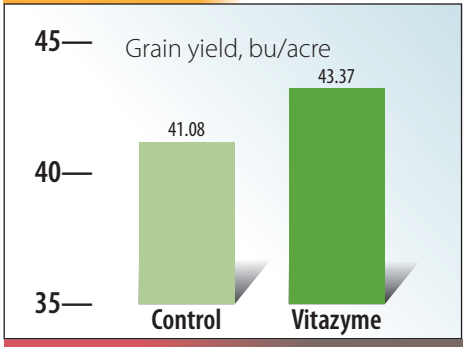
Decrease in crude protein with Vitazyme: (-) 0.4%-points

Test weight was marginally increased with Vitazyme, while grain protein decreased a bit, which is quite acceptable because low protein is needed for supreme quality of baker's flour. Less than 12% is considered premium quality.

Yield results:

Treatment	Yield	Yield change
	bu/acre	bu/acre
Control	41.08	—
Vitazyme	43.37	2.29 (+6%)

Grain Yield



Increase in grain yield with Vitazyme: 6%

Conclusions: A soft white winter wheat trial in Washington, comparing two 155-acre fields, one treated with a single 12.4 oz/acre Vitazyme application at 3 to 5 tillers, showed excellent improvements in plant and grain parameters (tillers per plant, height, grains per head, grain weight per head, and grain test weight. Weight per grain did not change, and crude protein of the grain decreased sightly (0.4 percentage points). **Differences in growth were noticeable between the two fields during the season, and stubble density was noticeably greater in the Vitazyme field.** Lower summer temperatures and greater rainfall would certainly have improved the response to Vitazyme, but a 6% yield increase was very acceptable. These results illustrate the effectiveness of this program for soft white winter wheat growers in Washington, especially during a dry and heat-stressed year.

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2014 Crop Results

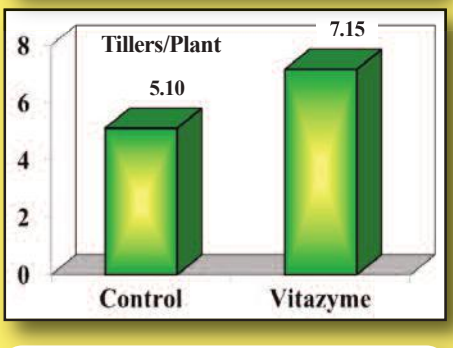
Vitazyme on Winter Wheat

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington
Farmer: Brandt Farms
Location: Waterville, Washington
Variety: Eltan
Planting date: August 22, 2013
Seeding rate: 36 lb/acre
Seedbed preparation: conventional
Previous crop: winter wheat and summer fallow
Soil type: volcanic ash mixed with sand and clay
Experimental design: A 120-acre field of winter wheat was divided into two parts, one being about 40 acres which received Vitazyme once in the spring. The purpose of the study was to determine the effects of this product on wheat growth and yield.

1. Control **2. Vitazyme**

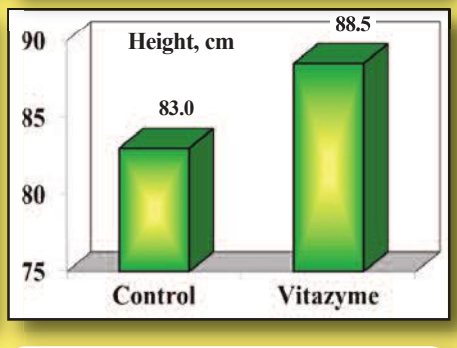
Fertilization: 65 lb/acre of a mixed fertilizer
Vitazyme application: 13 oz/acre sprayed in late April along with a herbicide. A Summers Ultimate NT 90-foot boom sprayer was used.
Growing season weather: a dry year overall
Plant mapping results: On August 1, four days before harvest, 20 random and average plants from both treatments were dug and evaluated for several parameters.

Tillers Per Plant



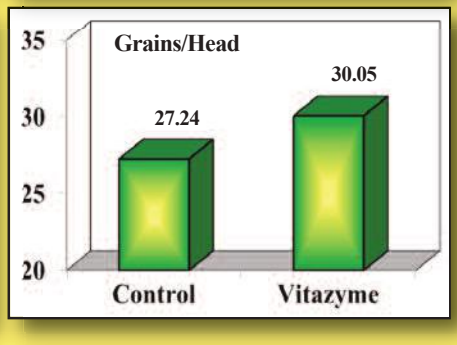
Increase in tillers per plant with Vitazyme: 40%

Plant Height



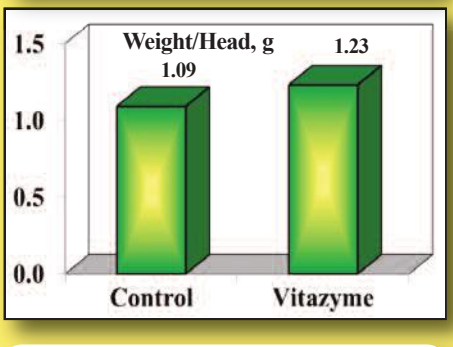
Increase in plant height with Vitazyme: 7%

Grains Per Head



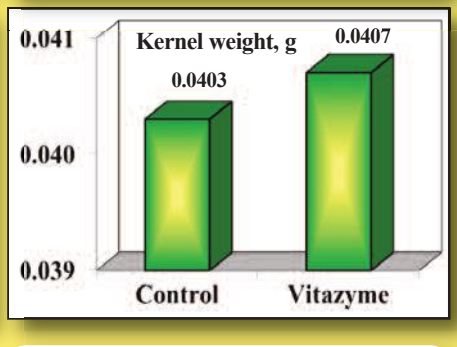
Increase in grains per head with Vitazyme: 10%

Grain Weight Per Head



Increase in grain weight per head with Vitazyme: 13%

Kernel Weight



Increase in kernel weight with Vitazyme: 1%

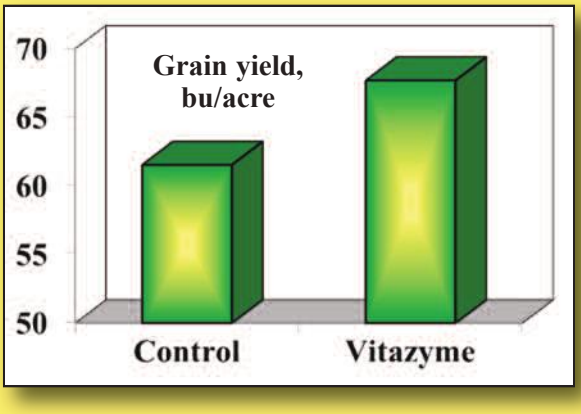
All five measured parameters were improved with Vitazyme application, in particular tillers per plant. Head size and grain weight per head were also notably increased.

Harvest date: August 5, 2014

Yield results: Multiple 1.3-acre strips, one combine width, were harvested in each treatment, and the combine monitor yield values were averaged.

Treatment	Grain yield	Yield change
	bu/acre	bu/acre
Control	61.53	—
Vitazyme	67.69	6.16 (+10%)

Increase in grain yield with Vitazyme: 10%



Conclusions: A field scale winter wheat trial in central Washington revealed that Vitazyme, applied in late April at 13 oz/acre with a herbicide, stimulated all measured plant parameters, and boosted yield by 10%. This increase resulted in about $37.00/acre more income, with a cost of Vitazyme of only about $6.00/acre, a $31.00 net return, or a cost;benefit ratio of 6.2:1. Tillering was greatly improved (40%) by this single application, but plant height, grains per head, and grain weight per head were also elevated. The farmer noticed shortly after the Vitazyme treatment that the wheat grew back quicker in the tractor and sprayer tracks than in the untreated control areas. This program for wheat growers is highly recommended to enhance yields and profits in Washington.

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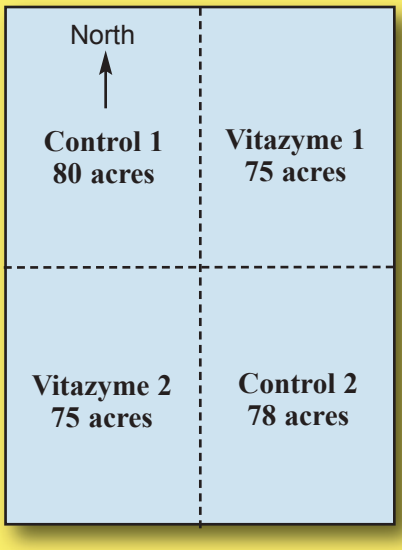
2014 Crop Results

Vitazyme on Winter Wheat



Researchers: Dale Whaley, Washington State University Douglas County Extension Service, and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington
Farmer: Jordan Farms
Variety: Eltan
Planting date: August 28, 2013
Planting rate: 50 lb/acre
Tillage: conventional
Previous crop: winter wheat and fallow
Soil type: clayey
Weed control: herbicides
Experimental design: Two quarter sections of land planted to winter wheat were each divided approximately in half, with one portion treated with Vitazyme to evaluate the effect of this product on crop yield, as well as oncertain parameters. The product was applied once fairly late in the growing season.

1. Control **2. Vitazyme**

Fertilization: 55 lb/acre of anhydrous ammonia
Vitazyme application: 13 oz/acre in late May. A Flex Coil boom sprayer was used.
Growing season weather: excessive rain during fall planting, and record-low rainfall in 2014
Harvest date: August 4 and 5, 2014. Samples of plants were collected July 29, six days before harvest.
Plant mapping results: Twenty typical plants from each of the four acres were dug by both researchers, and results are averaged for all 20 plants.

Improvements in Plant Traits with Vitazyme

Tillers/Plant	33%
Plant height	12%
Grains/Head	21%
Grain weight/Head	41%
Kernel weight	12%
Test weight	0%

Parameter		Control	Vitazyme	Change
Tillers per plant	Field 1	4.85	6.40	
	Field 2	4.35	5.85	
	Mean	4.60	6.13	1.53 (+33%)
Plant height, cm	Field 1	74.15	80.10	
	Field 2	76.4	89.3	
	Mean	75.3	84.7	9.4 (+12%)
Grains per head	Field 1	29.2	33.7	
	Field 2	24.2	30.6	
	Mean	26.7	32.2	5.5 (+21%)
Grain weight per head, g	Field 1	1.04	1.46	
	Field 2	0.79	1.14	
	Mean	0.92	1.30	0.38 (+41%)
Kernel weight, g	Field 1	0.0356	0.0395	
	Field 2	0.0327	0.0371	
	Mean	0.0342	0.0383	0.0041 (+12%)
Test weight, lb/bu	Field 1	60.8	61.0	
	Field 2	61.0	60.8	
	Mean	60.9	60.9	0

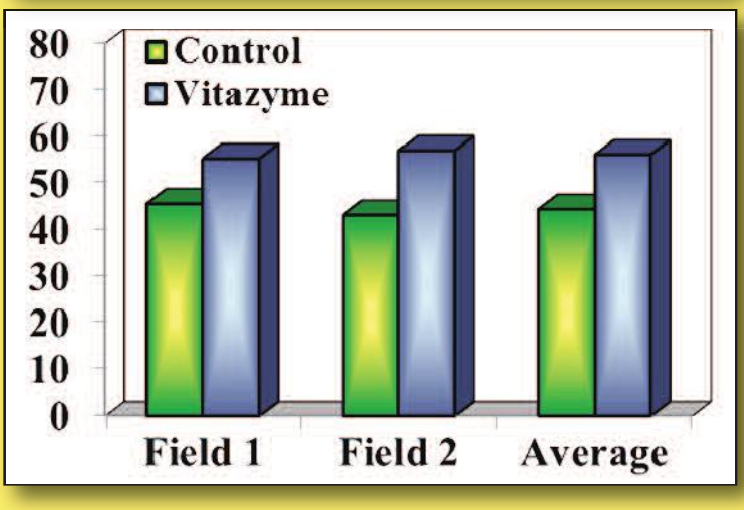
All plant characteristics improved with Vitazyme application, on both fields and in every case. Especially noteworthy are the increases in tillers/plant (33%), grains/head (21%), and grain weight/head (41%). An increase in kernel weight of 12% is also noteworthy.

Yield results: The farmer noticed a definite differences in color and height of the crop when he combined the fields.

Treatment	Field 1[a]			Field 2[b]			Total Area	
	Total yield	Area yield	Yield change	Total yield	Area yield	Yield change	Average yield	Yield change
	bu	bu/acre	bu/acre	bu	bu/acre	bu/acre	bu/acre	bu/acre
Control	3,640	45.50	—	3,356	43.03	—	44.28	—
Vitazyme	4,143	55.24	9.74 (+21%)	4,274	56.99	13.96 (+32%)	56.11	11.83 (+27%)

[a]Control = 80 acres; Vitazyme = 75 acres. [b]Control = 78 acres; Vitazyme = 75 acres.

Winter Wheat Yield, bu/acre



Increase in wheat yield with Vitazyme: 27%

Conclusions: A winter wheat trial in Washington involving two contiguous split-acre parcels, with Vitazyme applied once in late May, revealed that the product improved nearly all measured plant parameters at harvest, including tillers per plant (33%), plant height (12%), grains per head (21%), grain weight per head (41%), and kernel weight (12%). Test weight was not affected. Yield was improved by an impressive 27% for both split fields, a difference that the farmer could clearly see while harvesting. All of the crop sold as Number 1 Wheat. These results show the great value of utilizing Vitazyme to enhance winter wheat programs in central Washington.

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2014 Crop Results

Vitazyme on Winter Wheat

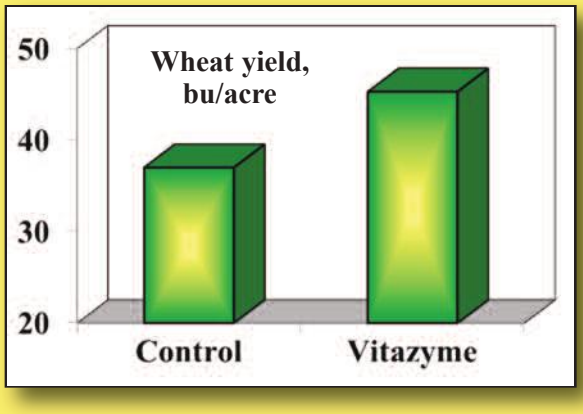
Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington
Farmer: Jordan Farms *Location*: Withrow, Washington *Variety*: Eltan
Planting date: September 10, 2013 *Planting rate*: 43 lb/acre *Soil type*: sandy loam
Seedbed preparation: conventional (harrowing, plowing, and cultivation)
Previous crop: winter wheat and summer fallow
Experimental design: A field of winter wheat totalling 193 acres was divided into a Vitazyme treated area (105 acres) and an untreated control area (88 acres), with one application, to determine the effect of the product on wheat yield.

1. Control **2. Vitazyme**

Fertilization: 45 lb/acre of anhydrous ammonia
Vitazyme application: 13 oz/acre sprayed on May 20 along with Olympus Flex broadleaf and grass killer, using a flex-coil boom sprayer
Weather for 2014: Rain delayed planting, and rainfall during the growing season was at a record low.
Harvest date: July 23 to 28, delayed by rain
Yield results:

Treatment	Wheat yield	Yield change
	bu/acre	bu/acre
Control	37.0	—
Vitazyme	45.4	8.4 (+23%)

Increase in wheat yield with Vitazyme: 23%



Grain test weight results: The control treatment gave 62.3 lb/acre test weight, while the Vitazyme treatment gave 62.4 lb/bu, nearly identical. Both treatments produced No. 1 wheat since the test weight exceeded 60 lb/bu.
Income results: Wheat was selling for $6.12/bu at the time of harvest. A Vitazyme price of $60.00/gal is used for the calculations; 13 oz/acre would cost $6.00.

Treatment	Wheat yield	Wheat income	Income change
	bu/acre	$/acre	$/acre
Control	37.0	226.44	—
Vitazyme	45.4	277.85	51.41

Income increase with Vitazyme: $51.41/acre

Cost:Benefit ratio with Vitazyme: 8.57:1

Conclusions: A winter wheat large-field study in central Washington revealed that one 13 oz/acre application of Vitazyme, applied with a herbicide, improved the yield by 8.4 bu/acre, a 23% increase. Using the current wheat price, that increase gave $51.41/acre more income, representing an 8.57:1 cost:benefit ratio for the $6.00/acre product investment. Such a great improvement in yield and income for a small investment, while requiring no extra trip across the field, reveals the excellent value of Vitazyme for wheat growers in the Pacific Northwest.

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2013 Crop Results

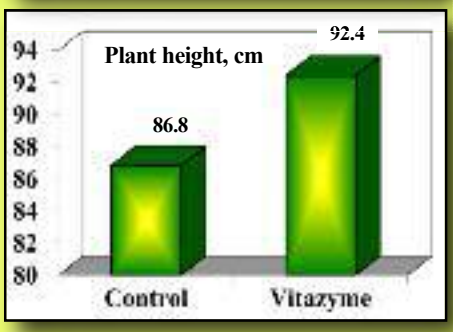
Vitazyme on Winter Wheat

Researcher: Jacob Hesseltine *Farmer*: Garth Hinderer *Location*: Waterville, Washington
Variety: Eltan soft white winter wheat *Previous crop*: fallow *Planting date*: mid August, 2012
Planting rate: 60 lb/acre *Tillage*: plowing, harrowing, cultivation
Experimental design: A 39.54-acre field was separated into two portions: 21.82 acres for Vitazyme application and 17.72 acres for an untreated control. Vitazyme was spring applied by air, to evaluate the effects of the product on winter wheat.

1. Control **2. Vitazyme**

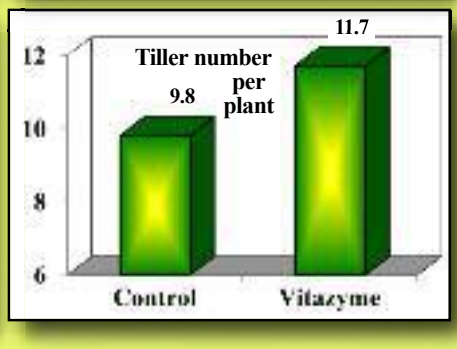
Fertilization: 50 lb/acre of N and 10 lb/acre of S applied in the spring
Vitazyme application: 11.7 oz/acre (0.9 liter/ha) applied by air on the 21.82 acres on May 20
Weather for 2013: Good, but with considerable late season rain that interfered with harvest
Harvest date: August 20 and 21, 2013
Pre-harvest evaluation: On August 8, 20 plants from both the Vitazyme and control areas were dug to evaluate plant parameters. Values are averages for the 20 plants.

Plant Height*

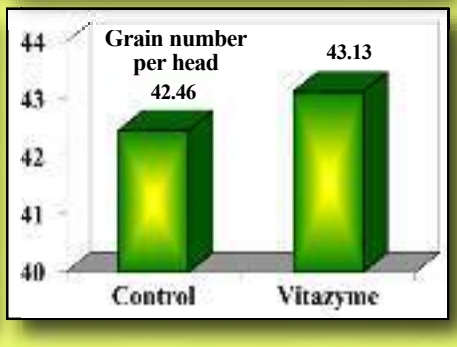


*Measured from soil level to tip of tallest tiller.

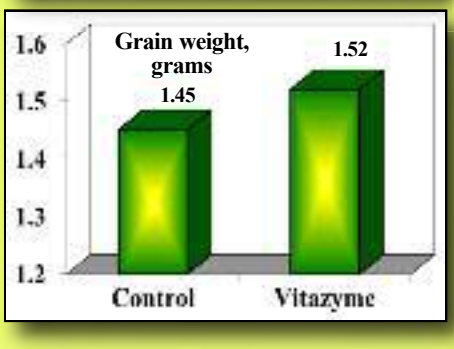
Productive Tillers/Plant



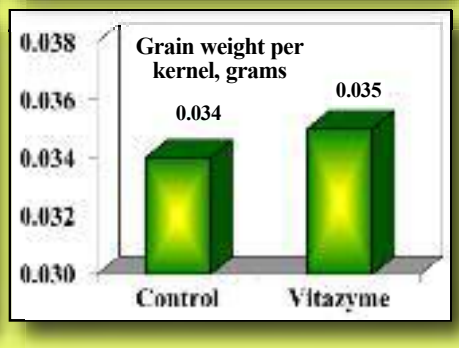
Grains Per Head



Grain Weight Per Head



Grain Weight Per Kernel



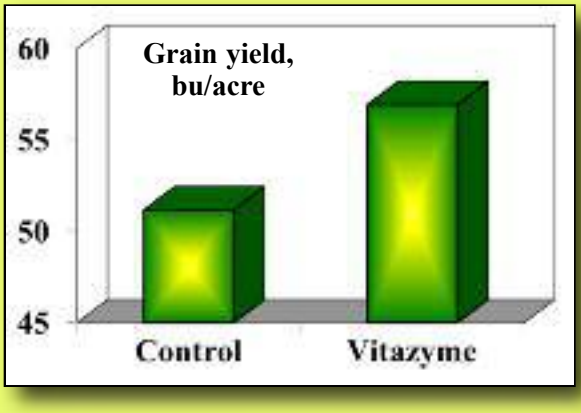
Increases with Vitazyme:

Plant height 7%
Productive tillers/plant 19%
Grains per head 2%
Grain weight/head 5%
Grain weight/kernel 3%

Yield results: A severe wind and rain storm on August 10 damaged the crop, the Vitazyme treatment more so than the control due to taller plants and heavier heads.

Treatment	Grain yield	Yield change
	bu/acre	bu/acre
Control	51.15	—
Vitazyme	56.92	5.77 (+11%)

Increase in grain yield with Vitazyme: 11%



Conclusions: A soft white winter wheat study in central Washington revealed that Vitazyme improved every plant parameter measured, especially productive tillers per plant (+19%). Grain yield was increased by 11%, and would likely have increased even more had the crop been harvested before a severe storm struck. Also, an application on the seeds, or early in the crop cycle, would likely have improved the yield increase, as would have a full 13 oz/acre application rate. This study shows the excellent effectiveness of foliar applied Vitazyme for wheat production in Washington.

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2012 Crop Results

Vitazyme on Winter Wheat

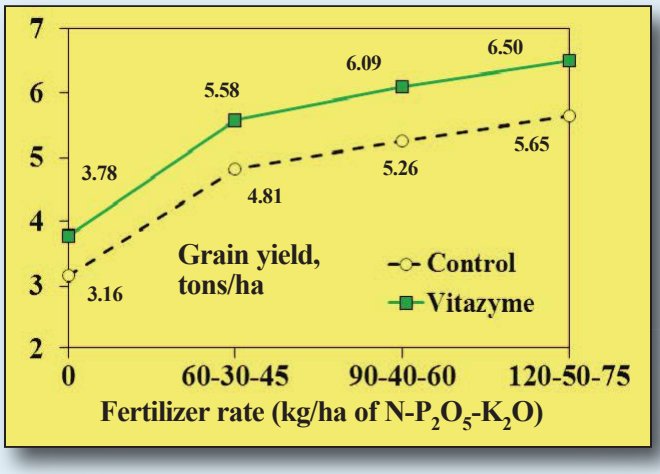
A Fertilizer Rate Study

Researcher: V. Plotnikov *Research organization*: National Academy of Agricultural Sciences
Location: Vinnytsia, Ukraine *Variety*: Carivna *Tillage*: conventional (disking, plowing, and cultivating) *Soil type*: gray podzolic (2.2% organic matter, 8.4 mg/100 g of soil hydrolyzed N, 15.8 mg/100 g of soil P, 12.4 mg/100 g of soil exchangeable K, pH = 5.5)
Planting date: October 7, 2011 *Previous crop*: peas *Planting rate*: 6 million seeds/ha
Experimental design: A replicated plot design wasinitiated with winter wheat, using four fertility levels, to evaluate the effect of Vitazyme on wheat yield, quality, disease incidence, and plant traits at four fertility levels. Four replications were used, and the plots were 0.1 ha in area.

Treatment	Vitazyme	Nitrogen	Phosphate	Potash
	----------	kg/ha	----------	
1	0	0	0	0
2	X	0	0	0
3	0	60	30	45
4	X	60	30	45
5	0	90	40	60
6	X	90	40	60
7	0	120	50	75
8	X	120	50	75

Fertilization: Phosphorus and potassium fertilizers were applied in the fall of 2011 during basic tillage, and nitrogen was applied in the spring.
Vitazyme application: For Treatments 2, 4, 6, and 8, a seed treatment of 1 liter of Vitazyme per ton of seed was applied, and later 0.5 liter/ha were applied to the leaves and soil at the boot stage (leaf tube formation).
Weather for 2012: favorable for crop development

Yield results:



Treatment	Yield increase with Vitazyme*	Income increase with Vitazyme*
	tons/ha	hrn/ha
2	0.62 (+20%)	1,095
4	0.77 (+16%)	1,457
6	0.83 (+16%)	1,581
8	0.85 (+15%)	1,623

*Yields and income are compared at the same fertility level.

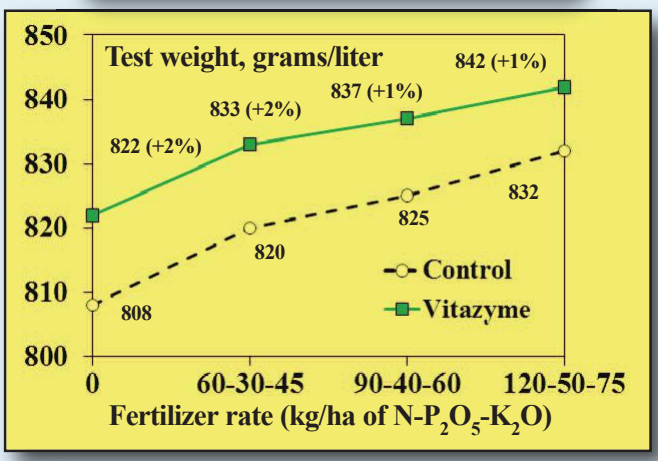
Yield increase with Vitazyme

No fertilizer 20%
Low N-P-K 16%
Medium N-P-K 16%
High N-P-K 15%

Note that at all fertility levels the yield was increased, but especially at the lowest level (20%). When low and medium rates were applied, the yields increased by 16%, and the high fertilizer rate boosted the yield by 15%. These results correspond with other studies over the years which have shown that the highest percentage yield increases are with the lower soil fertility levels. At any fertilizer application level, Vitazyme in this study has been shown to be an excellent, highly profitable addition to the wheat, production system.

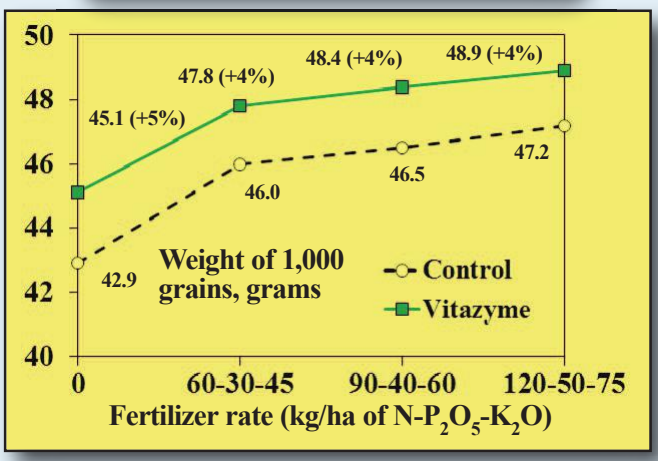
Quality results:

Grain Test Weight



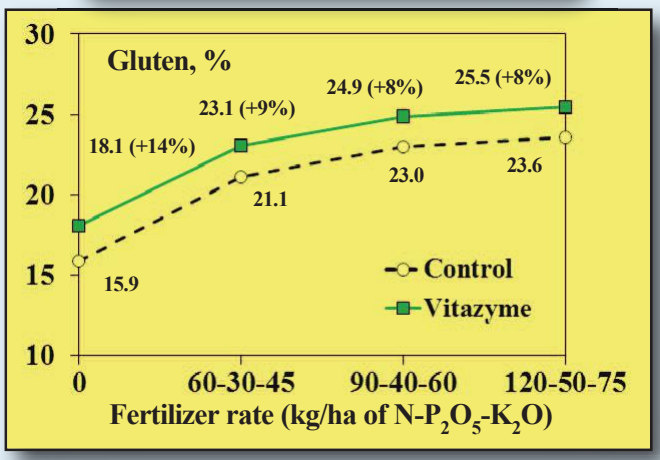
Increase in test weight with Vitazyme at the same fertilizer level: 1 to 2%

Weight of 1,000 Grains



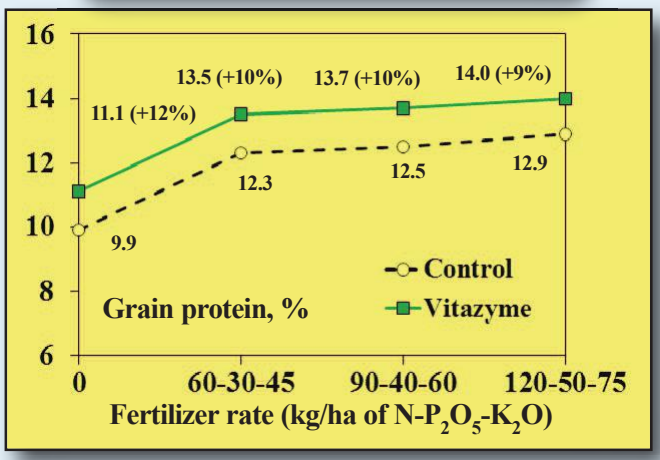
Increase in 1,000-grain weight with Vitazyme at the same fertility level: 4 to 5%

Grain Gluten



Increase in grain gluten with Vitazyme at the same fertilizer level: 8 to 14%

Grain Crude Protein

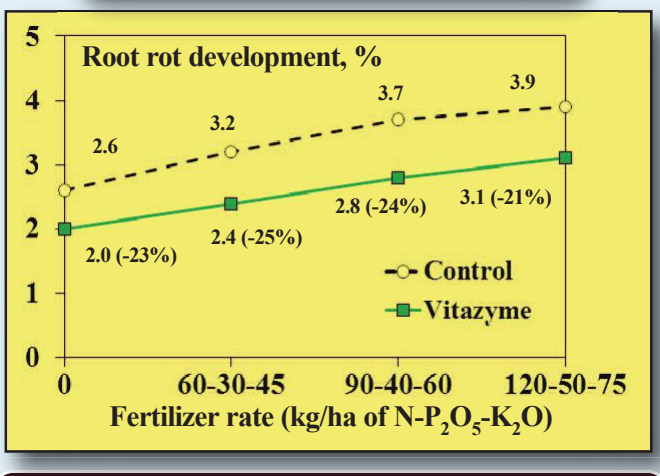


Increase in grain crude protein with Vitazyme at the same fertilizer level: 9 to 12%

All quality parameters responded positively to Vitazyme application – test weight, 1.000-grain weight, gluten, and protein – the higher fertilizer application rates giving somewhat reduced responses. Note that protein increased from 1.1 to 1.2 percentage points for all fertility levels.

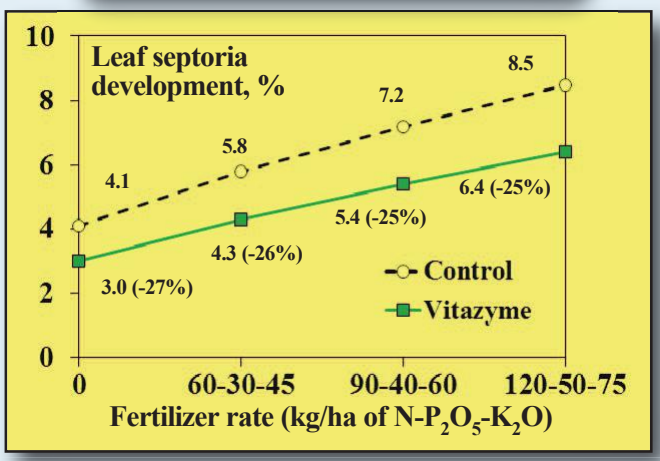
Disease results:

Root Rot Damage



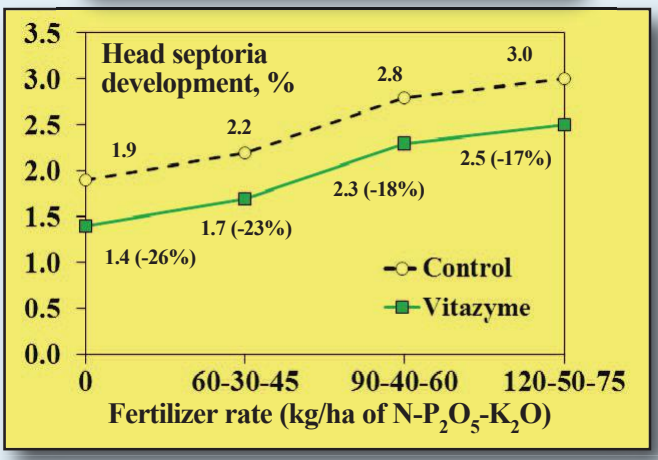
Decrease in root rot development with Vitazyme at the same fertilizer level: 21 to 25%

Leaf Septoria Damage



Decrease in leaf septoria development with Vitazyme at the same fertilizer level: 25 to 27%

Head Septoria Damage

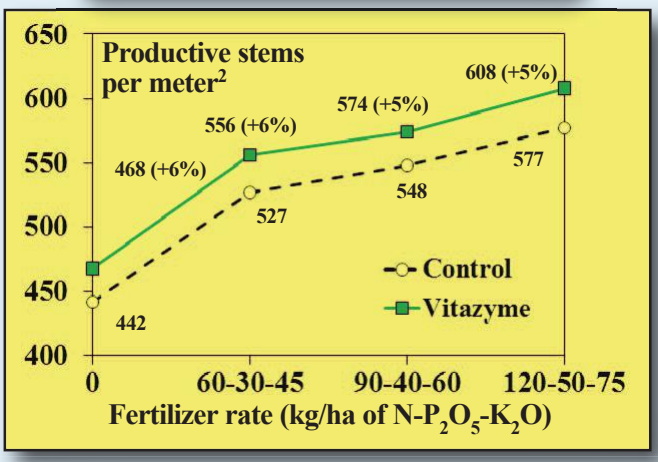


Decrease in head septoria damage with Vitazyme at the same fertilizer level: 17 to 26%

In every case Vitazyme reduced damage of fungi to roots, leaves, and heads, by from 17 to 27%. The greatest protection percentage-wise was found at the lowest fertility levels.

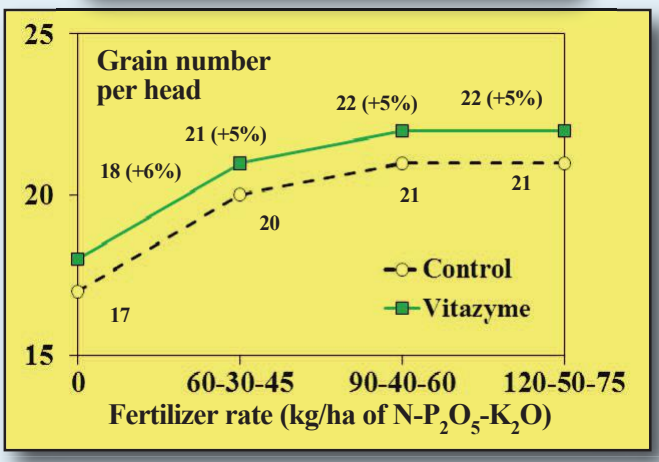
Plant structure results:

Stem Density

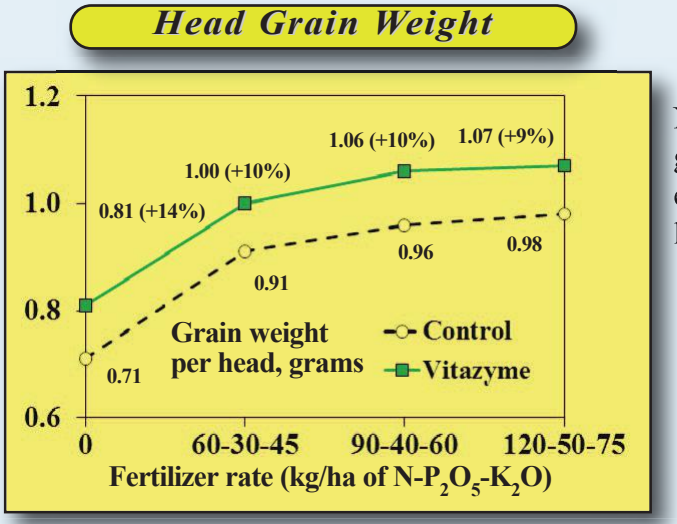


Increase in productive stems with Vitazyme at the same fertilizer level: 5 to 6%

Grains Per Head



Increase in grains per head with Vitazyme at the same fertility level: 5 to 6%



Increase in grain weight per head with Vitazyme at the same fertilizer level: 9 to 14%

Note that all parameters measured – stem density, grains per head, and grain weight per head – were all enhanced by Vitazyme at all fertilizer levels, especially percentage-wise at the lower fertilizer rates.

Conclusions: In this replicated Ukrainian study with Carivna wheat at four fertility levels, Vitazyme proved itself to be a very consistent crop enhancer. The product increased yield by 15 to 20%, the highest percentage increases at the lowest fertilizer levels. Income was also boosted substantially. Grain quality was likewise enhanced: test weight by 1 to 2%, 1,000-grain weight by 4 to 5%, gluten by 8 to 14%, and crude protein by 9 to 12%. Fungal root rot damage was reduced by up to 25%, and both leaf and head septoria development were reduced by 17 to 27%. Plant physical traits showed improvements as well, with productive stem density increasing by 5 to 6%, grains per head by the same amount, and grain weight per head by 9 to 14%. These consistent results show the great value of Vitazyme in improving both the quality and yield of winter wheat in Ukraine.

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2012 Crop Results

Vitazyme on Winter Wheat

Researcher: V. Plotnikov *Research organization*: National Academy of Agricultural Sciences
Location: Vinnytsia, Ukraine *Varieties*: several (see later in this report)
Tillage: conventional (disking, plowing, cultivating) *Previous crop*: corn
Seedbed preparation: plowing, harrowing, and cultivation
Soil type: gray podzolic (2.2% organic matter, 8.4 mg/100 g of soil hydrolyzed N, 15.8 mg/100 g of soil P, 12.4 mg/100 g of soil exchangeable K, pH = 5.5)
Planting date: October 13 and 18, 2011 *Planting rate*: 6 million seeds/ha
Experimental design: Plots of 0.1 ha, with four replicates, were laid out to evaluate the effect of Vitazyme on several winter wheat varieties at the Vinnytsia research station. The purpose of the trial was to evaluate the effect of one Vitazyme application on the yield of grain as compared to the untreated control.

1. Control **2. Vitazyme**

Fertilization: 50 kg/ha dry nitrogen in the spring
Vitazyme application: 0.5 liter/ha on the leaves and soil at the boot stage (leaf tube formation)
Weather for 2012: favorable for all crops
Yield results:

Treatment	Planting date	Grain yield		Yield change	Extra income
		Control	Vitazyme		
		tons/ha	tons/ha	tons/ha	hrn/ha
Carivna	October 13	4.11	4.54	0.43 (+10%)	765
Lisova pisnya	October 13	3.56	3.94	0.38 (+11%)	665
Popelyushka	October 13	3.06	3.74	0.68 (+22%)	1,265
Zymoyarka	October 13	3.29	3.51	0.22 (+7%)	391
Torrild	October 13	3.28	3.60	0.32 (+10%)	545
Skagen	October 13	3.20	3.74	0.54 (+17%)	985
Carivna	October 18	3.44	3.77	0.33 (+10%)	565
Lisova pisnya	October 18	3.23	3.60	0.37 (+11%)	645
Popelyushka	October 18	3.24	3.55	0.31 (+10%)	525
Zymoyarka	October 18	2.92	3.22	0.30 (+10%)	505

All varieties of winter wheat at both planting dates showed excellent yield increases with Vitazyme, ranging from 7 to 22%, with added income of up to 1,265 hrn/ha

Yield increase with Vitazyme

October 13 planting

Carivna	10%
Lisova pisnya	11%
Popelyushka	22%
Zymoyarka	7%
Torrild	10%
Skagen	17%

October 18 planting

Carivna	10%
Lisova pisnya	11%
Popelyushka	10%
Zymoyarka	10%

Conclusions: This winter wheat trial at the National Academy of Sciences in Vinnytsia, Ukraine, revealed that Vitazyme, applied at 0.5 liter/ha at the boot stage, produced excellent yield increases of from 7 to 22% for six varieties, whether applied on October 13 or October 18. Extra income ranged from 291 to 1,265 hrn/ha, proving the excellent value of Vitazyme for winter wheat production in Ukraine.