



Barley (Winter) With Vitazyme application

Researcher: V. V. Plotnikov

Research organizations: Plant Designs International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

Location: SE "Servih", Ovidiopol District, Odessa Region, Mykolayivka Village, Ukraine; southern Ukraine (270-350 mm of rain per year)

Variety: Snow Queen **Planting date:** October 16, 2019 **Planting rate:** 4.5 million seeds/ha **Previous crop:** winter canola

Tillage: disking to 6-8 cm, disking again to 20-22 cm, cultivation to 4-5 cm

Soil type: typical Chernozem (4.1% organic matter)

Experimental design: A winter barley field was selected to compare the effects of Vitazyme with an untreated control, to evaluate the effectiveness of this plant growth stimulator to improve the yield of grain. Vitazyme was sprayed after emergence in the fall, and again in the spring.

1 Control 2 Vitazyme

Fertilization: 10-26-26 kg/ha of N-P₂O₅-K₂O at planting; 46 kg/ha of N in the spring

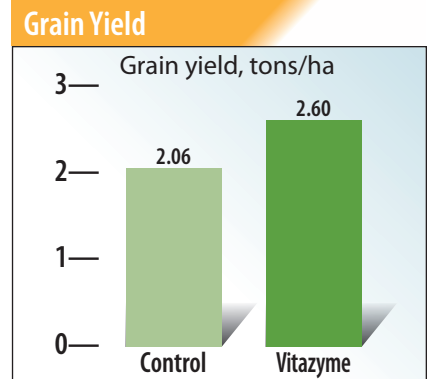
Vitazyme application: 0.5 liter/ha sprayed after emergence in the fall, on November 6, 2019; 0.5 liter/ha sprayed on the leaves in the spring, on April 6, 2020

Weather for the growing season: very dry

Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	2.06	—
2. Vitazyme	2.60	0.54 (+26%)

Increase in grain yield with Vitazyme : 26 %



Income results: The grain yield increase of 0.54 ton/ha produced an income increase of \$116/ha.

Conclusion: A Ukrainian winter barley trial in 2019-2020, which compared two 0.5 liter/ha foliar/soil applications of Vitazyme (fall and spring) to the untreated control resulted in an excellent grain yield increase of 26%, that brought the farmer an extra \$116/ha income. This result proves the great efficacy of using Vitazyme to improve the yield and profits for barley growers in Ukraine.

Barley (Winter) *Use of the Cold Start variation of Vitazyme*

Researcher: V.V. Plotnikov

Research organizations: Plant Designs International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

Location: "Valentina" Farm, Ustynivka District, Kirovograd Region, Ustynivka Township, Ukraine; central Ukraine
(440 to 590 mm of rain per year)

Variety: 9 Val **Planting date:** October 20, 2019 **Planting rate:** 4 million seeds/ha **Previous crop:** sunflowers

Tillage: disking to 20-22 cm, cultivation to 4-5 cm **Soil type:** typical Chernozem (4.0% organic matter)

Experimental design: A winter barley field was divided into an untreated and a Vitazyme Cold Start treated area, to evaluate the effectiveness of this plant growth stimulator to improve the yield of grain.

① Control ② Vitazyme Cold Start

Fertilization: unknown

Vitazyme Cold Start application: 1.0 liter/ha sprayed on the leaves at stem elongation, on April 27, 2020

Weather conditions: During the spring growing season of 2020, the air temperature dropped to -3 to -9°C from April 1 to April 20.

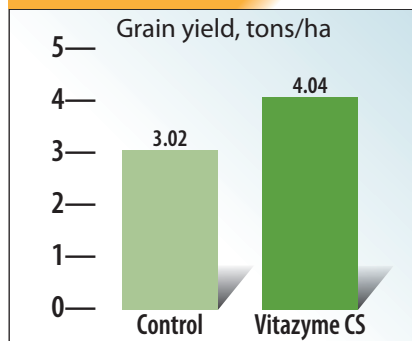
Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control*	3.02	—
2. Vitazyme Cold Start**	4.04	1.02 (+34%)

*Without Vitazyme Cold Start for stress relief.
**To help reduce cold stress on the crop.

*Increase in grain yield
with Vitazyme Cold Start: 34%*

Grain Yield



Conclusions: A study on winter barley in central Ukraine, which compared to a single application of Vitazyme Cold Start (1.0 liter/ha at stem elongation) to an untreated control, revealed that the grain yield was improved by a substantial 34% (1.02 tons/ha), this in spite of a dry summer. This result revealed the ability of Vitazyme Cold Start to help overcome cold stress. The efficacy of this product for winter barley production in Ukraine is thus shown to be excellent.

Income results: The extra 1.02 tons/ha yield gave \$239/ha more income than the untreated control.



Barley (Winter) *Use of the Cold Start variation of Vitazyme*

Researcher: V.V. Plotnikov

Research organizations: Plant Designs International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

Location: ALLC "Dnipro", Pogrebyshcne District, Vinnytsia Region, Monchin Village, Ukraine; Central Ukraine(440-590 mm of precipitation per year) **Variety:** Naomi, F1 generation

Planting date: October 5, 2018

Planting rate: 4 million seeds/ha **Previous crop:** sunflowers

Soil type: Podzolized Chernozem (humus=3.5%)

Field preparation: cultivation with a heavy cultivator to 20-22 cm, disking to 10-12 cm

Experimental design: A winter barley field was divided into normally treated and Vitazyme treated portions to evaluate the effects of Vitazyme Cold Start on the yield of grain..

① **Control** ② **Vitazyme Cold Start**

Fertilization: 20-52-52 kg/ha of N-P₂O₅-K₂O applied during fall cultivation, 15-15-15 kg/ha of N-P₂O₅-K₂O during planting, and 85 kg/ha of N in the spring

Vitazyme Cold Start application:

1 liter/ha sprayed on the leaves and soil at greenup on April 30, 2019

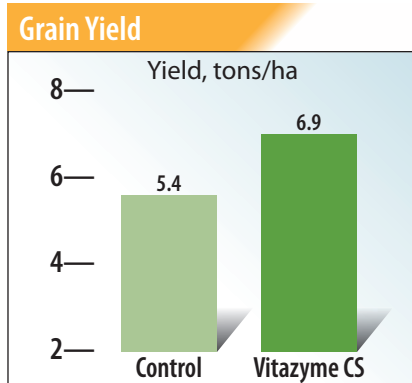
Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	5.4	—
2. Vitazyme Cold Start	6.9	1.5 (+28%)

Increase in yield with Vitazyme Cold Start: 28%



Root development has been greatly improved with Vitazyme applied to the plants in this trial. The yield has consequently been noticeably improved.



Conclusions: This winter barley trial with Vitazyme Cold Start revealed that a single 1 liter/ha spring application to the greening leaves increased the grain yield by a full 28%. This result illustrates the great efficacy of this product to boost barley yields in Ukraine.



Barley (Winter) With a Vitazyme Cold Start Spring Application

Researcher: V.V. Plotnikov

Research organizations: Plant Designs International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

Location: LLC "VKAF Maiaky", Odessa Region, Maiaky Village, Ukraine; Southern Ukraine (270-350 mm of precipitation per year)

Variety: Luran, F1 generation

Planting date: October 1, 2018

Planting rate: 4.5 million seeds/ha

Previous crop: peas

Soil type: Typical chernozem (humus=4.1%)

Field preparation: disking to 6-8 cm, a second disking to 14-16 cm

Experimental design: A winter barley field was divided into normally treated and Vitazyme treated portions to evaluate the effects of Vitazyme + Vitazyme Cold Start on the yield of grain.

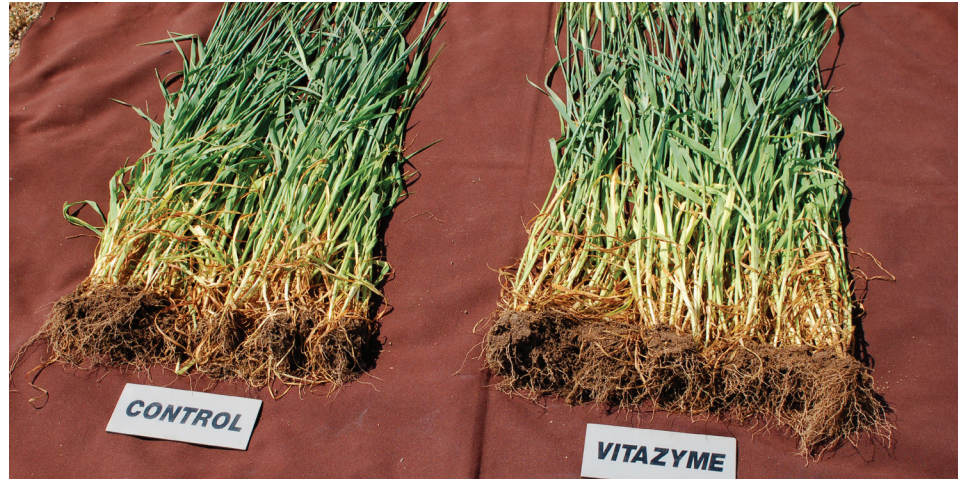
1 Control

2 Vitazyme + Vitazyme Cold Start

Fertilization: 21 kg/ha of N and 24 kg/ha of S during disking; 10-20-12 kg/ha of N-P₂O₅-K₂O at planting; 80 kg/ha of N as KAS urea-ammonia mixture in the spring, with Vitazyme Cold Start

Vitazyme and Vitazyme Cold Start

application: 0.5 liter/ha of Vitazyme on the seeds before planting; 0.3 liter/ha of Vitazyme Cold Start sprayed on the leaves and soil at early tillering on February 2, 2019

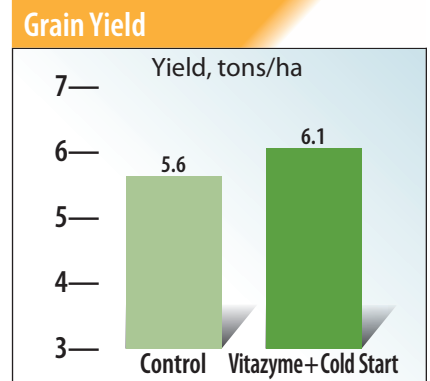


The brassinosteroids, triacontanol, and B vitamins in Vitazyme have triggered much better root and leaf development in this barley trial, leading to a 9% yield increase.

Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	5.6	—
2. Vitazyme + Cold Start	6.1	0.5 (+9%)

Increase in yield with Vitazyme + Vitazyme Cold Start: 9 %



Income results: The extra 0.5 ton/ha of yield gave added income of \$76/ha.

Conclusions: This winter barley trial in Ukraine, using Vitazyme on the seeds (0.5 liter/ha) and Vitazyme Cold Start on the leaves and soil in the spring at early tillering (0.3 liter/ha), showed a very respectable yield increase of 0.5 ton/ha, giving the farmer \$76/ha greater income. This program is seen to be an excellent adjunct to barley production in Ukraine.

Barley (Winter) with Vitazyme application

Researcher: V.V. Plotnikov

Research organizations: Plant Designs International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

Location: LLC "APK Nastashka", Rokyma District, Kyiv Region, Nastashka Village, Western Ukraine (550-620 mm of precipitation per year)

Variety: Hannelore, F1 generation **Planting date:** September, 30, 2018

Planting rate: 4 million seeds/ha **Previous crop:** sunflowers **Soil type:** Podzolized chernozem (humus=3.3%)

Field preparation: disking to 10-12 cm, deep cultivation with a heavy cultivator to 20-22 cm

Experimental design: A barley field was divided into normally treated and Vitazyme treated portions to evaluate the effects of Vitazyme on the yield of the barley grain.

① Control ② Vitazyme

Fertilization: 13-39-34 kg/ha of N-P₂O₅-K₂O applied during fall cultivation; 5-14-20 kg/ha of N-P₂O₅-K₂O at planting in the spring

Vitazyme application: Four days before planting, on September 26, 2018, the barley seeds were treated with Vitazyme to give 1.0 liter/ha

Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	7.62	—
2. Vitazyme	8.08	0.46 (+6%)

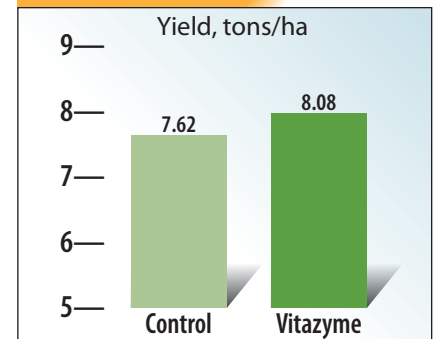
**Increase in yield
with Vitazyme: 6 %**

Income results: A 6% yield increase

(0.46 ton/ha) gave an additional \$74/ha income.

Conclusions: Vitazyme at 1.0 liter/ha, applied to the seeds, increased barley grain yield by an acceptable 0.46 ton/ha (6%), giving the farmer \$74/ha more income. This result illustrates the value of this program for complementing the growth of barley in Ukraine.

Grain Yield





Winter Barley with Vitazyme application

Researcher: Vadim Plotnikov
Research organization: PJSC "Vin Agro," Ukraine, Plant Designs, New York, USA, and Agro Expert International, Ukraine
Location: Rozdilna District, Odessa Region, Kuchurgan Village, Ukraine
Variety: 9 Val (generation 1)
Seeding rate: 4.0 million seeds/ha
Planting date: November 26, 2016
Previous crop: sunflowers
Soil type: typical Chernozem; humus=4.4%
Soil preparation: plowing to 20-22 cm, harrowing to 4-5 cm
Experimental design: A winter barley field was divided into Vitazyme treated and untreated control areas to determine the efficacy of this product in promoting yield increases.

1 Control 2 Vitazyme

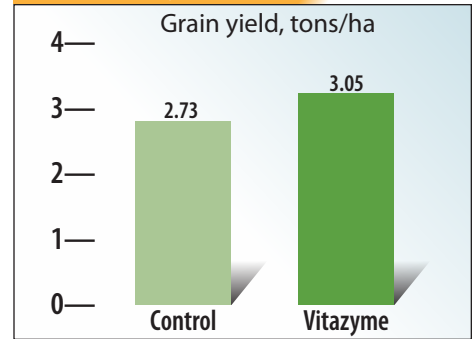
Fertilization: 15-15-15 kg/ha of N-P₂O₅-K₂O as a starter at planting, and 30 kg/ha of N broadcast in the spring
Vitazyme application: 0.5 liter/ha sprayed on the leaves and soil at flower bud formation (July 5), and 0.5 liter/ha sprayed on the leaves at mid-pod development (July 31)
Growing season weather: dry
Yield results:

Treatment	Grain yield tons/ha	Yield change ton/ha
1. Control	2.73	—
2. Vitazyme	3.05	0.32 (+12%)

Increase in grain yield with Vitazyme: 12%

Income results: At a price of \$193.75/ton of barley, the added 0.32 ton/ha gave an additional \$62/ha income.

Winter Barley Grain Yield



Conclusions: A barley study of farmer-field size was conducted during a very dry year in southern Ukraine. Despite the low yield, a 1 liter/ha Vitazyme application in the spring improved the yield by 0.32 ton/ha (12%), giving an enhanced income of \$62/ha, showing the value of Vitazyme as a very useful and profitable barley treatment, even during drought situations.



Winter Barley with Vitazyme application

Researcher: Vadim Plotnikov
Research organization: "Svitanok" Farm, Ukraine, Plant Designs, New York, USA, and Agro Expert International, Ukraine
Location: Sarat District, Odessa Region, Nadia Village, Ukraine
Variety: Luran (generation 1)
Seeding rate: 4.0 million seeds/ha
Planting date: October 10, 2016
Previous crop: sunflowers
Soil type: typical Chernozem; humus=3.5%
Soil preparation: disking to 6-8 cm, plowing to 20-22 cm, harrowing to 4-5 cm

Experimental design: A winter barley field was divided into Vitazyme treated and untreated control areas to determine the efficacy of this product in promoting yield increases.

1 Control 2 Vitazyme

Fertilization: 10-26-26 kg/ha of N-P₂O₅-K₂O as starter at planting, and 65-36 kg/ha N-S broadcast in the spring

Vitazyme application: 1 liter/ha sprayed on the leaves and soil in the spring (April 7, 2017)

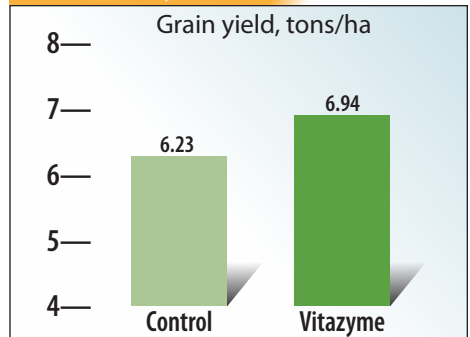
Growing season weather: dry

Yield results:

Treatment	Grain yield tons/ha	Yield change ton/ha
1. Control	6.23	—
2. Vitazyme	6.94	0.71 (+11%)

Increase in grain yield with Vitazyme: 11%

Winter Barley Grain Yield



Barley grown with Vitazyme in a trial in Ukraine reveals advanced growth compared to the control. Note the growth stage, plant biomass, and root development.

Income results: At a price of \$178.87/ton of barley, the added 0.71 ton/ha gave an additional \$127/ha income.

Conclusions: This winter barley trial in southern Ukraine revealed that Vitazyme increased the grain yield by 0.71 ton/ha (11%), which provided an income improvement of \$127/ha for a single application at 1 liter/ha in the spring. Such results show the great efficacy of this program for barley growers in Ukraine.

Vital Earth Resources

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2012 Crop Results

Vitazyme on Winter Barley

Researcher: V. Plotnikov

Research organization: National Academy of Agricultural Sciences

Location: Vinnytsia, Ukraine

Variety: Luran

Previous crop: corn

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, 2011

Tillage: conventional (disking, plowing, and cultivation)

Planting rate: 5 million seeds/ha

Experimental design: A replicated plot design was established using plots of 0.1 ha, and four replicates, to evaluate the effect of Vitazyme on the yield on the yield of winter barley.

1. Control

2. Vitazyme

Fertilization: 50 kg/ha of dry nitrogen in the spring

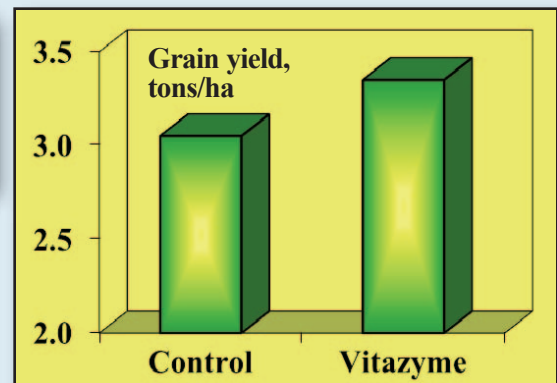
Vitazyme application: 0.5 liter/ha on the leaves and soil at the boot stage (leaf tube formation)

Weather for 2012: favorable for crop development

Yield results:

Treatment	Grain yield tons/ha	Yield change tons/ha	Extra income hrn/ha
Control	3.05	—	—
Vitazyme	3.35	0.30 (+10%)	475

**Increase in grain yield with
Vitazyme: 10%**



Conclusions: This replicated barley trial in Ukraine revealed that Vitazyme, applied at the boot stage at 0.5 liter/ha, increased grain yield by an excellent 10%, resulting in improved income of 475 hrn/ha. The utilization of a seed treatment at fall planting would likely have boosted the yield and income even more. These results prove the excellent value of this product in agricultural systems for barley production in Ukraine.