

# 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.

## ① Control ② Vitazyme

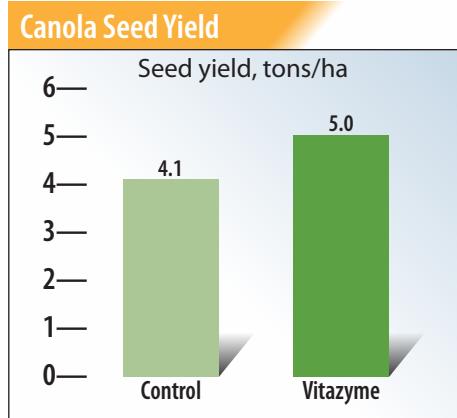
**Fertilization:** 5-0-20 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O applied in-furrow at planting on August 24, 2024, plus 200 kg/ha of N and 24 K/ha of S top-dressed in the spring

**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:

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

**Increase in canola seed yield with Vitazyme: 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.

# Winter Canola

with Vitazyme application—A Fertilizer Efficiency Study

**Researcher:** V. V. Plotnikov

**Research organization:** Agro Expert International, Kaharlyk, Ukraine; Plant Designs International, Rochester, New York; National Academy of Agrarian Sciences of Ukraine, Institute of Feed and Agriculture of Podillia, Ukraine

**Location:** Vinnytsia District, Vinnytsia Region, Agronomichne Village, Ukraine; central Ukraine (440-590 mm of rain per year)

**Variety:** Monopolist Elite

**Planting date:** September 7, 2023

**Planting rate:** 1 million seeds/ha

**Previous crop:** winter wheat

**Tillage:** disking to 6-8 cm, plowing to 20-22 cm, pre-planting cultivation with a combined Europack unit to 2.5-3.5 cm

**Soil type:** gray podzolic (2.0% organic matter)

**Experimental design:** A canola field was divided into an untreated control and a Vitazyme treated portion to evaluate the effect of this product on growth parameters before winter, and then on growth effects as well as seed yield and quality in 2024.

## ① Control ② Vitazyme

**Fertilization:** unknown

**Vitazyme application:** seed treatment before planting at 1.0 liter/ton of seed and 1.5 liters/ton of seed

**Plant growth parameter results:** The plants for both treatments were evaluated on November 27, 2023, when fall growth had ceased. Plant values were averaged.



The superiority of leaf growth for the Vitazyme treatments in this photograph is clearly seen, compared to the untreated control plants on the bottom.

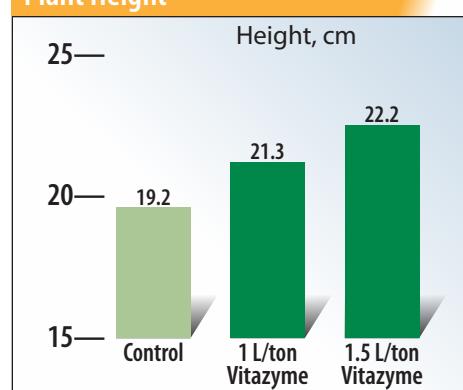


The Vitazyme treated area to the right is clearly noted for being taller and denser, and the treated plant laid out on the right is much more growthy than the untreated plants.

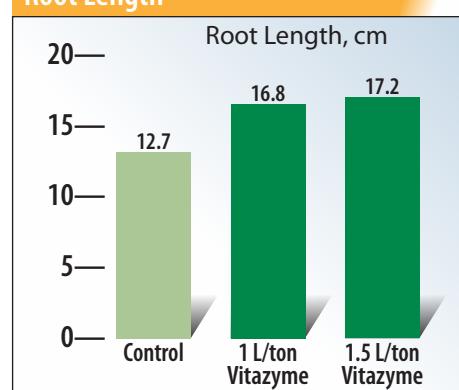


This photo shows the small plot combine used to harvest samples of the Vitazyme treated and control areas of the field trial. The yields of the Vitazyme treatments were 12% and 15% greater than the untreated control plot.

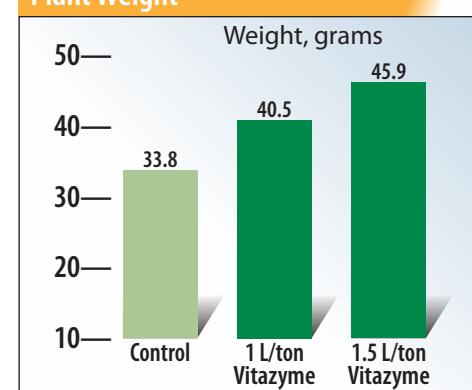
### Plant Height

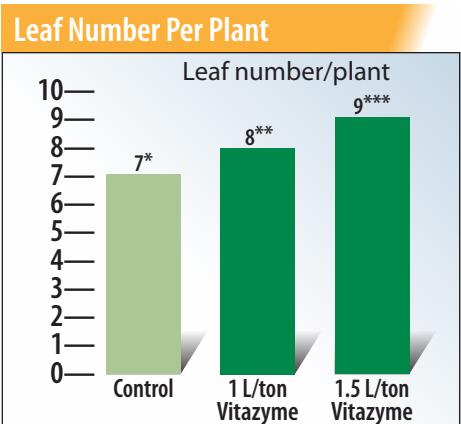


### Root Length



### Plant Weight



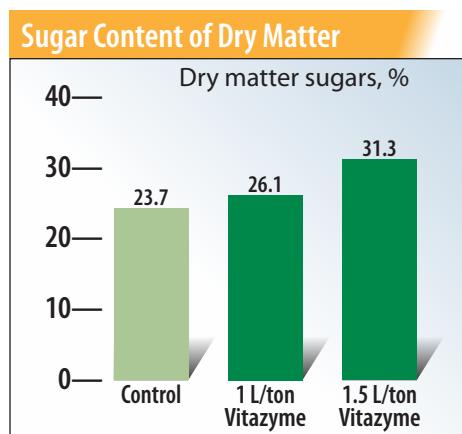


Plant maturity rating:  
\*BBCH 24 \*\*BBCH 25 \*\*\*BBCH 26

### Increase in plant growth parameters with Vitazyme

	1 liter/ton	1.5 liters/ton
Plant height	11%	16%
Root length	32%	35%
Plant weight	20%	36%
Leaf number	14%	29%

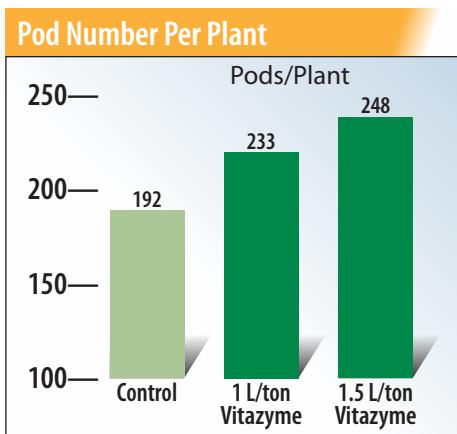
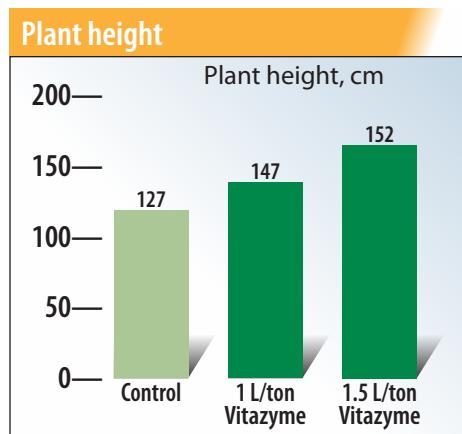
**Winter hardness results:** The ability of the canola crop to withstand winter cold was evaluated with the sugar concentration analysis before winter. Plants were harvested on November 27, 2023, and the sugar content was determined.



### Sugar content increase with Vitazyme

1 liter/ton of seed .....	10%
1.5 liters/ton of seed .....	32%

**Spring growth parameter results:** On June 21, 2024, plant height and pod number/plant were measured.



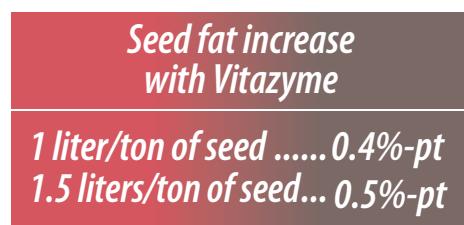
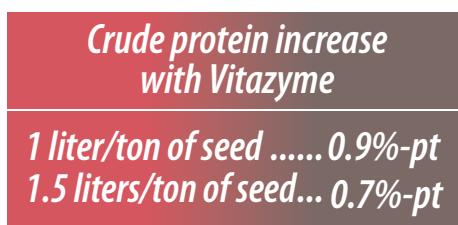
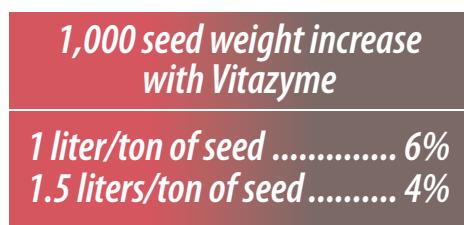
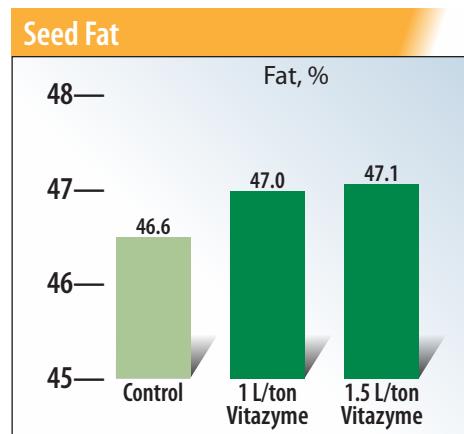
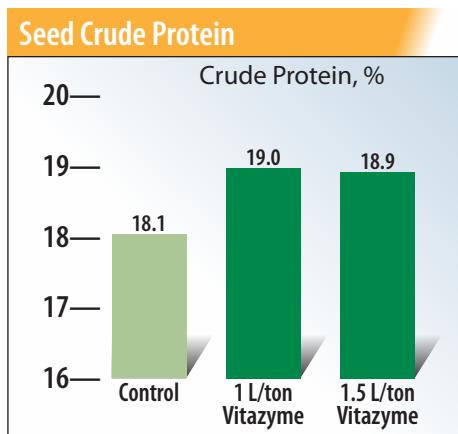
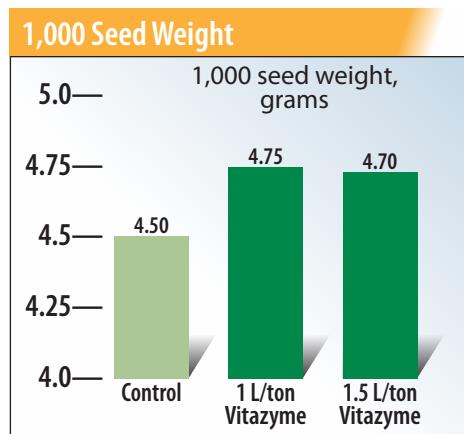
### Plant height increase with Vitazyme

1 liter/ton of seed .....	16%
1.5 liters/ton of seed .....	20%

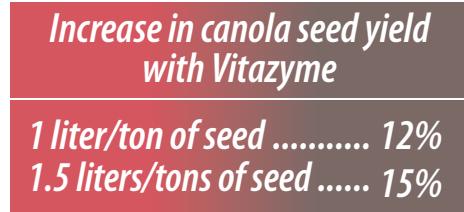
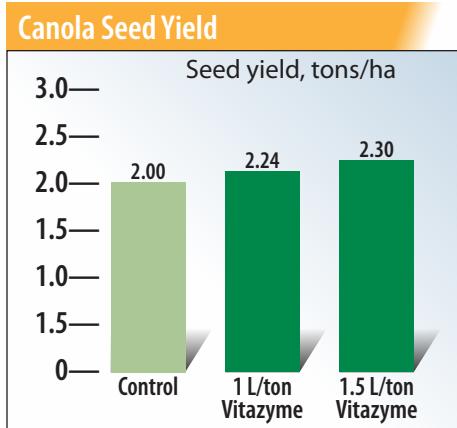
### Pod number increase with Vitazyme

1 liter/ton of seed .....	21%
1.5 liters/ton of seed .....	29%

**Seed quality results:** Determinations were made at harvest (stage BBCH 86) of seed quality parameters.



### **Yield results:**



**Income results:** The 1 liter/ton Vitazyme rate gave an income increase of \$138/ha, while the 1.5 liters/ton rate produced a \$173/ha increase.

**Conclusions:** This Ukrainian canola field study, which compared the effects of Vitazyme as a seed treatment at 1 and 1.5 liters/ton of seed, revealed that the fall growth of the canola plants was accelerated for all four parameters measured compared to the untreated control. These increases were highest for the 1.5 liters/ton application, and varied from 16% for plant height to 36% for plant weight. Winter, hardiness of the crop, as measured by tissue sugar content, was increased by 10 to 32% by Vitazyme. Spring measurements on plant growth showed that the Vitazyme seed treatment improved plant height by up to 20%, and pods per plant by up to 29%. Seed quality parameters were also improved by Vitazyme: 1,000 seed weight by up to 6%, crude protein by up to 0.9 percentage point, and seed fat by up to 0.5 percentage point. The yield at harvest was boosted by 0.24 ton/ha (12%) and 0.30 ton/ha (15%) by the 1 and 1.5 liters/ton treatments. Both of these treatments boosted the farmer's income significantly, by up to \$173/ha. These results show the great viability of this biostimulant program for Ukrainian farmers with canola, with the 1.5 liters/ton of seed being the better of the two treatments.

# Winter Canola with Vitazyme application

**Researcher:** V. V. Plotnikov

**Research organization:** Agro Expert International, Kaharlyk, Ukraine; Plant Designs International, Rochester, New York; National Academy of Agrarian Sciences of Ukraine, Institute of Feed and Agriculture of Podillia, Ukraine

**Location:** FG "Kolyvaylo," Vinnytsia District, Vinnytsia Region, Miziakivski Khutory, Ukraine

**Variety:** Dominator

**Planting date:** September 6, 2023

**Planting rate:** 500,000 seeds/ha

**Previous crop:** winter wheat

**Soil type:** gray podzolic (2.0% organic matter)

**Soil preparation:** plowing to 20-22 cm, pre-planting cultivation with a combined Europak unit to 3-4 cm

**Experimental design:** A canola field was divided into an untreated control and Vitazyme treated portion to determine the effect of this biostimulant on plant development and seed yield.

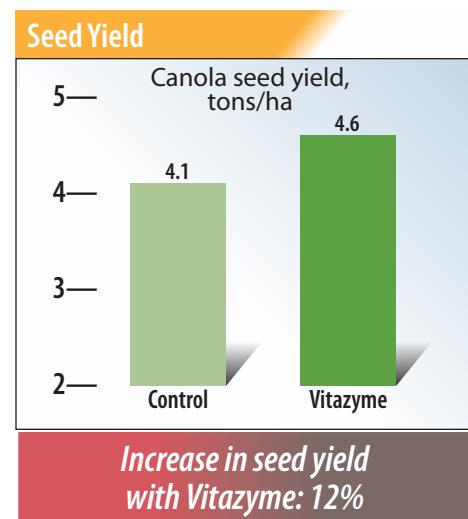
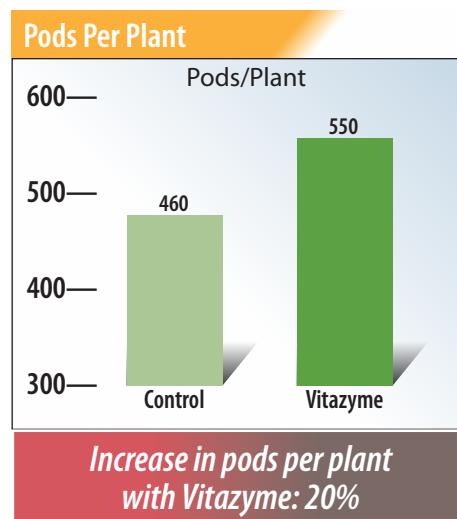
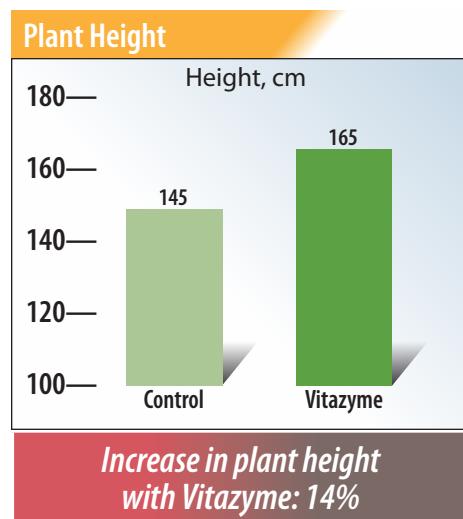
## 1 Control 2 Vitazyme

**Fertilization:** 152 kg/ha N and 26 kg/ha S in the spring as a top dressing

### Vitazyme application:

0.5 liter/ha sprayed on the leaves and soil at early flowering (BBCH 62) on May 2, 2024, tank mixed with a fungicide and insecticide

**Growth parameter results:** Measurements were made on June 26, 2024.



**Income results:** This single 0.5 liter/ha application of Vitazyme increased the income of the farmer by \$276/ha.

**Conclusions:** A field-scale trial in central Ukraine, using a Vitazyme application of 0.5 liter/ha at early bloom, produced good improvements in plant height (14%) and pod number (20%) compared to the untreated control. These increases translated into a yield increase of 0.5 ton/ha (12%), which netted the farmer \$276/ha greater income. This simple and inexpensive biostimulant is thus shown to be highly effective in improving the farmer's production and income without concerns of product toxicity.



At harvest the Vitazyme treated winter canola is impressively tall and dense, and yielded 12% more than the untreated control.



The canola on the left with a Vitazyme treatment at early flowering shows greater plant density than the untreated control plants on the right.

# Canola (Winter)

with Vitazyme Bio on Winter Canola

**Researchers:** Vadim V. Plotnikov

**Research organization:**

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

**Location:** Salag Agro LLC, Bolgrad  
District, Odessa Region, Vesely Kut  
Village, Ukraine; southern Ukraine  
(270-350 mm of precipitation  
per year)

**Variety:** Hybrivok

**Planting date:** August 15, 2022

**Planting rate:** 400,000 seeds/ha

**Previous crop:** winter wheat

**Tillage:** disking to 10-12 cm

**Planting depth:** 2 cm with a

Pottinger planter

**Soil type:** Mollisol (2.5% organic  
matter)

**Experimental design:**

A field-scale winter canola  
trial in southern Ukraine was  
designed to compare the effect  
of Vitazyme Bio on canola seed  
yield. A portion of the field was  
left untreated while the rest of  
the field received a biostimulant  
application.

## 1 Control 2 Vitazyme Bio

**Fertilization:** An in-furrow  
application of 6 kg/ha of N and  
11 kg/ha of P<sub>2</sub>O<sub>5</sub> was made at fall  
planting. Then 40 kg/ha of N was  
top-dressed in the spring.

**Vitazyme Bio application:** 0.5  
liter/ha sprayed on the leaves and  
soil at BBCH 59 (bud stage), on  
April 26, 2023



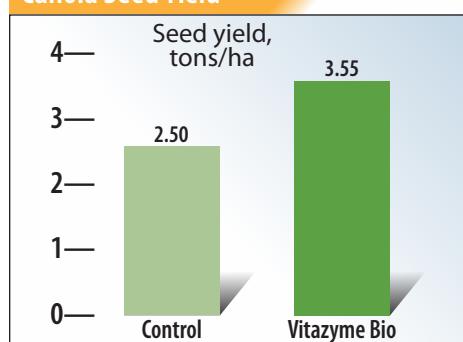
This beautiful field of canola was treated with Vitazyme Bio at the bud stage, and produced a major yield increase of 42% above the untreated control.

## Yield results:

Treatment	Yield tons/ha	Yield change
		tons/ha
1. Control	2.50	—
2. Vitazyme Bio	3.55	1.05 (+42%)

**Yield increase with  
Vitazyme Bio: 42%**

## Canola Seed Yield



**Income results:** With a 1.05 ton/ha (42%) yield increase with Vitazyme Bio, the farmer netted \$388/ha more income.

**Conclusions:** This winter canola trial, which utilized only 0.5 liter/ha of Vitazyme Bio in part of the field at the bud stage, revealed that the seed yield was improved by a remarkable 42% with this biostimulant. Income was also increased, by \$388/ha. These results prove how profitable Vitazyme Bio use can be for canola farmers in southern Ukraine.

# Canola with Vitazyme Cold Start application

**Researchers:** Vadim V. Plotnikov

**Research organization:**

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

**Location:** PAE "Oleksandrivs'ke,"  
Uman District, Cherkasy Region,  
Oleksandrivka Village, Ukraine

**Variety:** Temptation

**Planting date:** August 27, 2021

**Planting rate:** 4 million seeds/ha

**Previous crop:** winter wheat

**Tillage:** disking to 6-8 cm, plowing  
to 28-30 cm, cultivation to 2-3 cm

**Soil type:** typical chernozem  
(4.2% organic matter)

**Experimental design:** A canola field  
was divided into a Vitazyme Cold Start  
treated portion, while the remainder  
of the field was left untreated. The  
purpose of the trial was to evaluate  
the effect of Vitazyme Cold Start  
on canola yield.

## 1 Control 2 Vitazyme twice

**Fertilization:** 8-24-24 kg/ha of  
N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O in-furrow at planting;  
108 kg/ha of N and 34 kg/ha of S  
broadcast in the spring

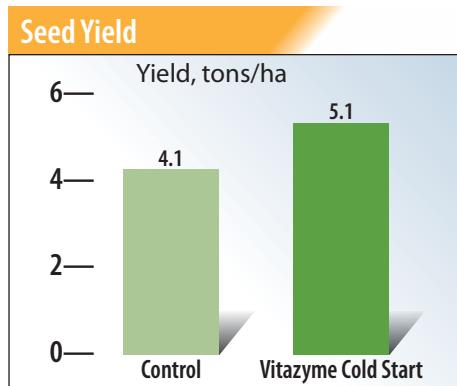
## Vitazyme Cold Start application:

0.5 liter/ha sprayed foliar in the fall (October 12, 2021) at the BBCH 23 stage (6 leaves); 1.0 liter/ha sprayed foliar  
in the spring (April 30, 2022) at the BBCH 55 stage (budding). Vitazyme Cold Start is a cold and wet weather  
variation of regular Vitazyme.

## Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
1. Control	4.1	—
2. Vitazyme Cold Start	5.1	1.0 (+24%)

**Yield increase with  
Vitazyme Cold Start: 24%**



**Income results:** The effect of a 1.0 ton/ha yield increase was to increase  
the income to the farmer by \$383/ha.



This Vitazyme Cold Start treated canola in the Cherkasy Region yielded 24% more seed than the  
untreated control.

**Conclusions:** This winter canola  
field scale trial with Vitazyme  
Cold Start in Ukraine, using a fall  
foliar application of 0.5 liter/ha  
at the 6-leaf stage, and a spring  
foliar application of 1.0 liter/ha  
at the budding stage, provided  
an excellent 1.0 ton/ha yield  
increase (+24%). Such an increase  
provided the farmer an income  
increase of \$383/ha, showing the  
great utility of this program for  
canola growers in Ukraine.

# Canola with Vitazyme Bio (Organic Vitazyme) application



**Researchers:** Vadim V. Plotnikov

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

**Location:** PFC "Kolos," Bilhorod-Dnistrovsky District, Odessa Region, Marazliivka Village, Ukraine; southern Ukraine (270-350 mm of rain per year)

**Variety:** DK Impression KL

**Planting date:** August 8, 2021

**Planting rate:** 400,000 seeds/ha

**Previous crop:** winter wheat

**Tillage:** disking to 6-8 cm, direct seeding to 2 cm with a Mzuri planter

**Soil type:** typical Chernozem (4.0% organic matter)

**Experimental design:** A canola field was divided into a Vitazyme Bio treated portion, while the remainder of the field was left untreated. The purpose of the trial was to evaluate the effect of Vitazyme Bio on canola yield.

## 1 Control 2 Vitazyme Bio

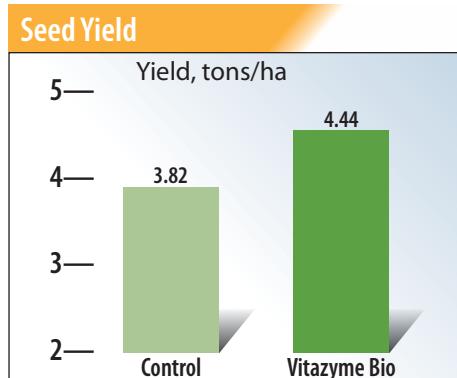
**Fertilization:** 9-45-25 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) in-furrow at planting; 180 kg/ha of N and 42 kg/ha of S broadcast in the spring

**Vitazyme Bio application:** 0.8 liter/ha sprayed on the leaves at BBCH 59 (bud stage), on April 29, 2022.

### Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
1. Control	3.82	—
2. Vitazyme Bio	4.44	0.62 (+16%)

**Yield increase with Vitazyme Bio: 16%**



**Income results:** The additional 0.62 ton/ha yield with Vitazyme Bio produced an added \$242/ha of income.

**Conclusions:** A field-scale canola trial conducted in southern Ukraine in 2022 revealed that a Vitazyme Bio application of 0.8 liter/ha, sprayed on the plants at the bud stage, produced an excellent yield increase of 0.62 ton/ha (+16%). This yield increase boosted net income to the farmer by \$242/ha, showing the great value of the Vitazyme Bio program for Ukrainian farmers.

# Canola (Winter) with Vitazyme Bio application

**Researcher:** V.V. Plotnikov

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

**Location:** "Alfa" Farm, Berezivka District, Odessa Region, Ryasnopol Village, Ukraine; southern Ukraine (270-3350 mm of rain per year)

**Variety:** Klavir KL **Planting date:** August 29, 2020 **Planting rate:** 0.35 million seeds/ha **Previous crop:** winter wheat

**Tillage:** disking to 5-6 cm, deep disking to 18-20 cm, cultivation to 3-4 cm **Soil type:** Chernozem (4.3% organic matter)

**Experimental design:** A canola field was divided into a Vitazyme Bio treated portion, with an untreated portion left as a control, to evaluate the effect of this product as a foliar spray on seed yield.

## ① Control ② Vitazyme Bio

**Fertilization:** 16-16-16% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O with the seeds at planting; 81 kg/ha N in the spring

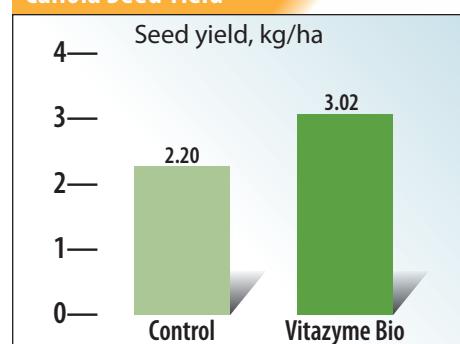
**Vitazyme Bio application:** 0.5 liter/ha, sprayed on the leaves and soil on April 26, 2021, at early bloom (BBCH 59). Vitazyme Bio is the same as Organic Vitazyme, which is marked under that name in different parts of the world.

### Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	2.20	—
2. Vitazyme Bio	3.02	0.82 (+37%)

*Increase in seed yield  
with Vitazyme Bio: 37%*

### Canola Seed Yield



The application of only 0.5 liter/ha of Vitazyme Bio at early bloom caused a great increase in seed yield: 0.82 ton/ha (37%).

**Income results:** The 0.82 ton/ha yield increase resulted in a net income increase of \$611/ha.

**Conclusions:** A winter canola split-field trial in southern Ukraine, using 0.5 liter/ha of Vitazyme Bio sprayed on the leaves at early bloom, resulted in a 0.82 ton/acre (37%) yield increase. This increase provided an additional \$611/ha income, showing the considerable utility of this program for winter canola production.

# Canola (Winter) with Vitazyme application

**Researcher:** Darrel Carlisle **Research organization:** Carlisle Liquid Starters, Carroll, Manitoba, Canada

**Location:** Carrol, Manitoba, Canada **Variety:** unknown **Planting date:** unknown

**Experimental design:** A field of canola was treated in part with Vitazyme, to compare with another biostimulant ("45") applied alongside, to determine the effect of this product on the yield of canola seed.

## ① "45" ② Vitazyme

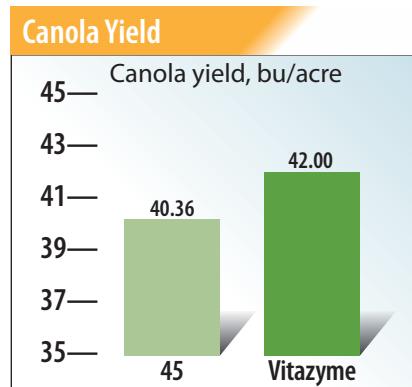
**Fertilization:** unknown **Vitazyme application:** 1.0 liter/ha along with the herbicide

**45 application:** This product is also called Lignijoule in Western Canada, and is a by-product of the pulp and paper industry.

**Yield results:** At harvest, two combined samples of canola were collected and weighed for both products.

Treatment	Seed yield	Average yield	Yield change
	bu/acre	bu/acre	bu/acre
45	37.40	—	—
45	43.32	40.36	—
Vitazyme	39.16	—	—
Vitazyme	44.84	42.00	1.64 (+4%)

**Increase in seed yield with Vitazyme: 4 %**



## Conclusions:

A canola trial in Manitoba, comparing a product called "45" with Vitazyme, showed a 4% better yield with Vitazyme. This increase was 1.64 bu/acre.

# Canola (Spring) with Vitazyme application

**Researcher:** William Hamman, Ph.D., and Donald Scott Walker

**Researcher organization:** Hamman AG Research, Inc., Lethbridge, Alberta, Canada **Location:** Coalhurst, Alberta, Canada

**Variety:** RRL **Planting date:** May 29, 2020 **Planting rate:** 6 kg/ha **Planting depth:** 2 cm **Row spacing:** 25 cm

**Planting method:** plot drill **Soil conditions at planting:** moist **Plot size:** 4 m x 8 m **Tillage method:** reduced till

**Soil type:** dark brown Chernozem; sandy clay loam; organic matter= 1.8%, pH= 8.35,

cation exchange capacity = 27.4 meq/100g; fertility level = good, drainage = good

**Experimental design:** A small-plot replicated canola trial, using four replications arranged in a replicated complete block design, was established using varying application times and methods of Vitazyme, to determine the effect of this biostimulant on the yield of spring canola.

## 1 Control

## 2 Vitazyme

Treatment	Vitazyme application <sup>1</sup>				
	Seeds	In-furrow	Pre-plant	Foliar/Soil	Early flower
1. Control	0	0	0	0	0
2. Vitazyme on seeds	1 liter/ton <sup>a</sup>	0	0	0	0
3. Vitazyme in-furrow	0	1 liter/ton <sup>b</sup>	0	0	0
4. Vitazyme on soil pre-plant	0	0	1 liter/ton <sup>c</sup>	0	0
5. Vitazyme foliar/soil early	0	0	0	1 liter/ton <sup>d</sup>	0
6. Vitazyme in-furrow + early flower	1 liter/ton	0	0		1 liter/ton <sup>e</sup>

<sup>a</sup>Applied with a seed treater on May 29.  
<sup>b</sup>Applied May 29.  
<sup>c</sup>Applied May 29 just before planting.  
<sup>d</sup>Applied at early heading on June 19, along with Liberty herbicide.  
<sup>e</sup>Applied at early flowering on July 15.

**Growing season weather:** July, August, and September were especially dry.

**Fertilization:** unknown

**Vitazyme application:** All rates were 1 liter/ha at the times shown on the table.

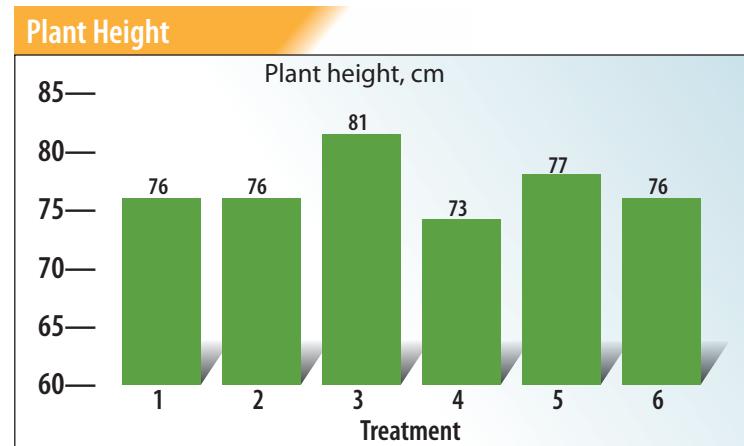
**Liberty herbicide:** Liberty is a BASF nonselective herbicide that controls a broad spectrum of broadleaf and grassy weeds.

It is used to control weeds for LibertyLink canola and other LibertyLink crops. The active ingredient is glufosinate ammonium.

**Harvest date:** September 11, 2020, using a Zurn 150 plot combine, harvesting an area of 1.5 x 8.0 meters for each plot (12.0m<sup>2</sup>).

**Plant height results:** Data was collected August 18.

Treatment	Plant height
cm	
1. Control	76
2. Vitazyme on seeds	76
3. Vitazyme in-furrow	81
4. Vitazyme on soil pre-plant	73
5. Vitazyme foliar/soil early	77
6. Vitazyme in-furrow + early flower	76
CV	6.67
Replicate F	0.21
Treatment F	1.01
Treatment probability (P=0.05)	0.447
LSD (P=0.05)	7.7

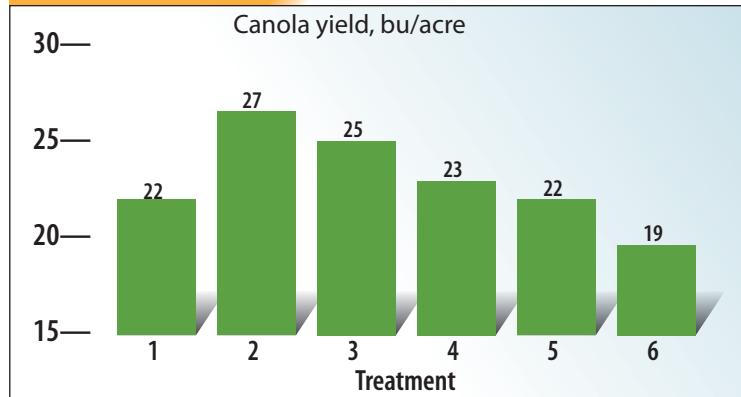


**Increase in plant height with Vitazyme applied in-furrow: 5 cm (+7%)**

## **Yield results:**

Treatment	Yield	Yield change
	bu/acre	bu/acre
1. Control	22	—
2. Vitazyme on seeds	27	5 (+23%)
3. Vitazyme in-furrow	25	3 (+14%)
4. Vitazyme on soil pre-plant	23	1 (+5%)
5. Vitazyme foliar/soil early	22	0 —
6. Vitazyme in-furrow + early flower	19	(-) 3 (-14%)
CV	18.8	
Replicate F	0.69	
Treatment F	1.43	
Treatment probability (P=0.05)	0.27	
LSD (P=0.05)	6.4	

## **Canola Yield**



**Conclusions:** This small-plot canola trial in Alberta, Canada, revealed that Vitazyme improved plant height by 7% during an early August evaluation. Yield effects were excellent with the seed treatment, giving a 23% yield increase, although due to plot variability the increase was not significant at P=0.05. The in-furrow and pre-plant soil treatment gave small yield increases, of 14% and 5%, respectively, while the application with Liberty herbicides brought no yield effect. The in-furrow plus early flower applications reduced yield for unknown reasons, possibly due to one unusually low-yielding plot. The Vitazyme seed and in-furrow treatments are shown to be good yield stimulators of canola under Alberta conditions despite a very dry summer.

### **Increase in canola yield with Vitazyme**

**Seeds .....** +23%  
**In-furrow .....** +14%  
**Pre-plant.....** +5%

# Canola (Winter) with Vitazyme application

**Researcher:** V. V. Plotnikov

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

**Location:** PE AF "Dzvony", Peremyshl District, Lviv Region, Bolotnya Village, Ukraine: western Ukraine (550-750 mm of rain per year)

**Variety:** Seifer **Planting date:** August 20, 2018 **Planting rate:** 0.5 million seeds/ha **Previous crop:** winter wheat

**Tillage:** disking to 5-6 cm, plowing to 26-28 cm, cultivation to 2-3 cm **Soil type:** dark-gray podzolic (2.2% organic matter)

**Experimental design:** A winter canola field was divided into an untreated control area and a Vitazyme treated area—one application at budding—to evaluate the effect of this biostimulant on canola seed yield.

## ① Control ② Vitazyme

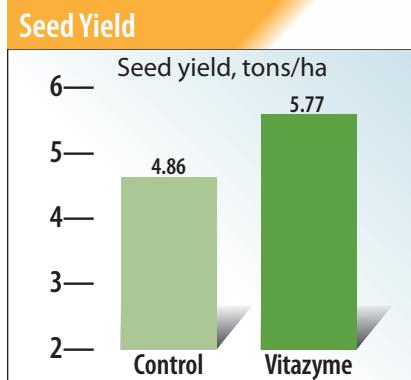
**Fertilization:** 30-60-90 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O during fall plowing; 170-10-13 kg/ha of N-Mg-S in the spring

**Vitazyme application:** 1.0 liter/ha sprayed on the leaves at budding on May 1, 2019

### Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	4.86	—
2. Vitazyme	5.77	0.91 (+19%)

**Increase in seed yield  
with Vitazyme: 19%**



**Income results:** As a result of the yield

increase of 19%, the net income for this trial was increased by \$439/ha

**Conclusions:** A winter canola trial in western Ukraine in 2018-19, which compared an untreated control portion of a field with a portion sprayed with 0.7 liter/ha of Vitazyme in the spring, resulted in a great 19% yield increase, and a \$439/ha net income increase. These results prove the excellent efficacy of Vitazyme for improving the productivity and profits of canola growers in Ukraine.

# Canola (Winter) with Vitazyme application

**Researcher:** V.V. Plotnikov

**Research organizations:** Plant Designs

International, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

**Location:** LLC "Spelta", Bilgorod-Dnistrovsk District, Odesa Region, Petrivka Village, Ukraine; Southern Ukraine (270-350 mm of precipitation per year)

**Variety:** Sherpa,

**Planting date:** August 30, 2018

**Planting rate:** 0.5 million seeds/ha

**Previous crop:** winter wheat

**Soil type:** Typical chernozem

(humus=4.1%)

**Field preparation:** disking to 10-12 cm plowing to 20-22 cm, cultivation to 3-4 cm

**Experimental design:** A winter canola field was divided into conventionally treated and Vitazyme treated portions to evaluate the effects of Vitazyme on the yield of the seeds.

## 1 Control 2 Vitazyme

**Fertilization:** 32-52-24 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O applied during fall plowing; 20 kg/ha of N applied at planting; 170 kg/ha of N and 36 kg/ha of S applied in the spring

**Vitazyme application:** 1.0 liter/ha sprayed on the leaves and soil at early flowering on April 28, 2019



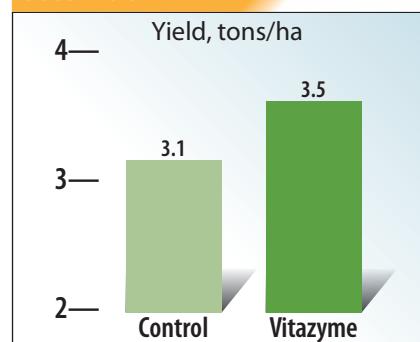
Tall, well-branched plants having well-filled seeds is the result of the Vitazyme program for this canola field, which yielded 13% more than the untreated control.

## Yield results:

Treatment	Yield		Yield change
	tons/ha	tons/ha	
1. Control	3.1	—	
2. Vitazyme + Cold Start	3.5	0.4 (+13%)	

**Increase in yield with Vitazyme: 13 %**

## Seed Yield



**Income results:** An extra 0.4 ton/ha of canola seeds produced added income of \$140/ha.

**Conclusions:** A winter canola trial conducted in Ukraine in 2018-2019, using a single Vitazyme foliar/soil spray at early flowering of 1.0 liter/ha, produced an excellent 13% yield increase, grossing \$140/ha more income for the farmer. This result points to the excellent responses farmers can expect with canola in Ukraine using the Vitazyme program.

# Winter Canola 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:** Mercedes **Planting date:** August 20, 2017

**Previous crop:** winter wheat

**Soil type:** typical chernozem (humus = 4.1%)

**Planting rate:** 400,000 seeds/ha

**Field preparation:** disking to 10-12 cm, plowing to 20-22 cm, cultivation to 3-4 cm

**Experimental design:** A winter canola field in southern Ukraine, planted in the late summer of 2017, was treated in part with Vitazyme the spring of 2018, and compared with untreated portions of the field to determine the product's effect on seed yield and profitability.

## 1 Control 2 Vitazyme

**Fertilization:** 32-52-24 kg/ha N-P<sub>2</sub>O<sub>5</sub>-S at plowing; 20 kg/ha

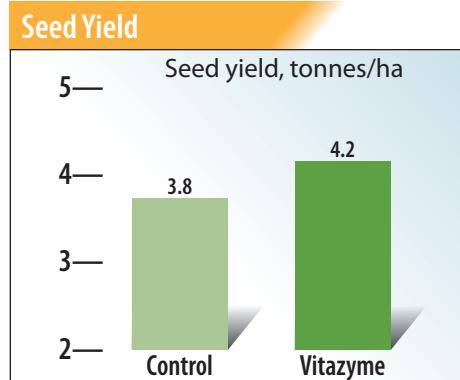
P<sub>2</sub>O<sub>5</sub> at planting; 170-36 kg/ha N-S in the spring

**Vitazyme application:** 1 liter/ha sprayed on the leaves and soil at early flowering on May 2

## Yield results:

Treatment	Seed yield	Yield change
	tonnes/ha	tonnes/ha
1. Control	3.8	—
2. Vitazyme	4.2	0.4 (+10%)

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



Notice the larger and deeper-penetrating root system of the Vitazyme treated winter canola. Better roots mean greater uptake of nutrients for higher yields.

**Income results:** A 0.4 tonne/ha yield increase gave \$178/ha greater income.

**Conclusions:** A western Ukraine winter canola study, using Vitazyme at 1 liter/ha in the spring at early flowering, resulted in a yield increase of 10%, while boosting income by \$178/ha. These results reveal the good efficacy of the program for canola growers in Ukraine.

# Winter Canola with Vitazyme application

**Researcher:** V. V. Plotnikov

**Research organization:** Plant Designs, Inc., Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

**Location:** Ivanove District, Odessa Region, Rosiiska Slobidka Village, Agricultural Farm Zolota Osin, Ukraine

**Variety:** Gybrirok **Planting date:** August 20, 2017 **Previous crop:** winter wheat

**Soil type:** typical chernozem (humus = 4.1%) **Planting rate:** 500,000 seeds/ha

**Field preparation:** disking to 14-16 cm, cultivation to 3-4 cm

**Experimental design:** A field trial in southern Ukraine with winter canola was prepared in 2017, with one portion of the field treated with Vitazyme the spring of 2018 to evaluate the effect of this product on canola yield and profitability.

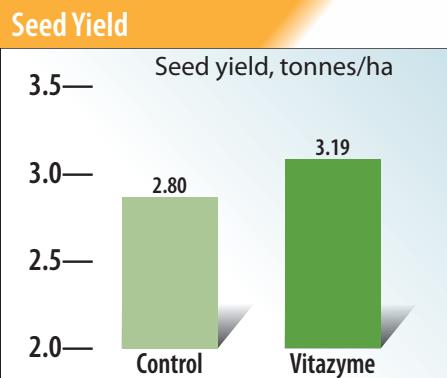
## 1 Control 2 Vitazyme

**Fertilization:** unknown

**Vitazyme application:** 0.5 liter/ha  
during bud formation on April 26

### Yield results:

Treatment	Seed yield tonnes/ha	Yield change tonnes/ha
1. Control	2.80	—
2. Vitazyme	3.19	0.39 (+14%)



**Increase in seed yield with Vitazyme : 14%**

**Income results:** A seed increase of 0.39 tonne/ha produced \$184/ha additional income.

**Conclusions:** Vitazyme at bud formation in this southern Ukrainian canola trial produced a yield increase of 14%, using only 0.5 liter/ha of the product. This led to an income increase of \$184/ha, showing the great utility of the program for canola growers in Ukraine.

# Winter Canola with Vitazyme application

**Researcher:** Vadim Plotnikov

**Research organization:** "Zolota osin" Farm, Ukraine,

Plant Designs, New York, USA, and Agro Expert

International, Ukraine

**Location:** Ivanivka District, Odessa Region, Rosiiska

Slobidka Village, Ukraine

**Variety:** ES Artist

**Seeding rate:** 0.4 million seeds/ha

**Planting date:** August 15, 2016

**Previous crop:** wheat

**Soil type:** typical Chernozem; humus=4.1%

**Soil preparation:** disking to 10-12 cm, plowing to 20-22 cm, harrowing to 3-4 cm

**Experimental design:** A winter canola 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:** 12-12-12 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O as starter at planting, and 52 kg/ha of N broadcast in the spring

**Vitazyme application:** 0.5 liter/ha sprayed on the leaves and soil at flower bud formation (April 30, 2017)

**Growing season weather:** dry

**Yield results:**

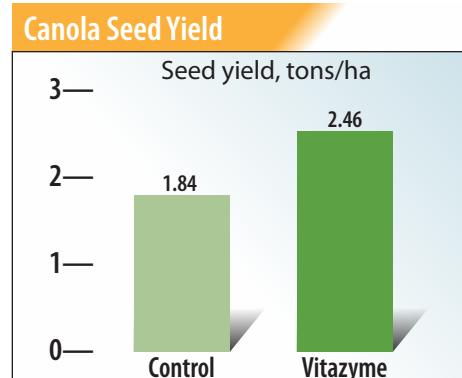
Treatment	Seed yield	Yield change
	tons/ha	ton/ha
1. Control	1.84	—
2. Vitazyme	2.46	0.62 (+34%)

**Increase in seed yield with Vitazyme: 34%**

**Income results:** At a price of \$475.81/ton of canola seed, the added 0.62 ton/ha gave an additional \$295/ha income.



Vitazyme treatments on canola in Ukraine resulted in excellent growth enhancement for both samples shown on the right side of this photo.



**Conclusions:** This winter canola southern Ukraine farm field Vitazyme trial, using one 0.5 liter/ha spray in the spring, proved that this program increased yield by 0.62 ton/ha (34%). This increase provided another \$295/ha income, showing that Vitazyme is a highly viable adjunct to farming programs for canola growers in Ukraine.



# Canola

*A study conducted in 2013***Research organization:**

SF- Soepenberg s.r.o., Trnava, Slovakia

**Farmer cooperation:** Jatov Trnovec,

Vahom, Slovakia

**Variety:** unknown

**Experimental design:** A canola field was divided into Vitazyme treated and untreated areas to evaluate the effect of this product on the yield of seeds.

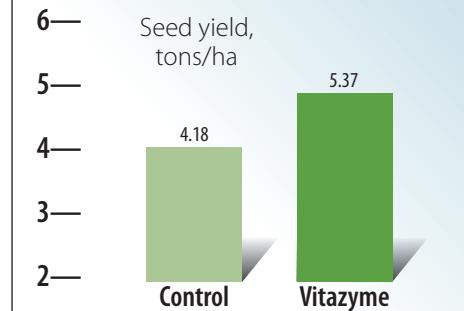
**① Control ② Vitazyme****Fertilization:** unknown

**Vitazyme application:** 1 liter/ha on the leaves and soil 50 days after planting, at flower formation along with fungicide and insecticide

**Yield results:**

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	4.18	—
Vitazyme	5.37	1.19 (+28%)

**Increase in canola seed yield with Vitazyme: 28%**

**Canola seed yield**

**Conclusion:** An excellent 28% yield increase resulted from a single 1 liter/ha Vitazyme application, applied 50 days after planting. Such results illustrate the great value of this product for canola growers in Slovakia.



# Canola with Vitazyme application

**Researchers:** Jacob Hesseltine and

Heba Khalid

**Research organization:** Vital Grow Distribution LLC, Waterville, Washington

**Farmer:** Jorgenson Brothers

**Location:** Coulee City, Washington

**Variety:** High Class 115 spring canola, Roundup Ready

**Planting date:** last week of April

**Seeding rate:** 3.5 lb/acre

**Seedbed preparation:** plowing, rod weeding

**Previous crop:** fallow in 2014, with fall canola, which froze out

**Soil type:** sandy loam

**Experimental design:** A 240-acre spring canola field was divided by a dirt road, which served as a separation for a 70-acre area treated with Vitazyme. The purpose of the study was to evaluate the effect of this product on plant characteristics.

## ① Control ② Vitazyme

**Fertilization:** 50 lb/acre of nitrogen in the fall of 2014

**Vitazyme application:** 13 oz/acre sprayed on the plants and soil in the spring, along with Roundup (glyphosate), using a 90-foot sprayer

**Growing season weather:** a very dry and hot summer

**Harvest date:** last part of August, 2015

**Plant parameter results:** On July 14, 10 typical plants were dug from both of the two treated areas, near to each other to minimize soil differences, to evaluate several plant parameters.

**Conclusion:** This split field spring canola trial in Washington, using just one Vitazyme

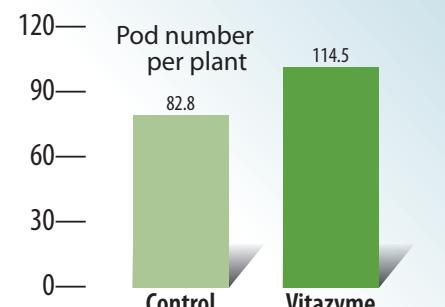


Note the marked increase in pod number per plant and pod size with Vitazyme.

application of 13 oz/acre, produced excellent plant responses when evaluated during the mid-growth period. Plant height was increased by 8%, pods per plant by 38%, stalk diameter by 27%, pod weight per plant by 47%, and average pod weight by 6%. These improvements set the stage for great yield increases, especially the greater pod number and weight per

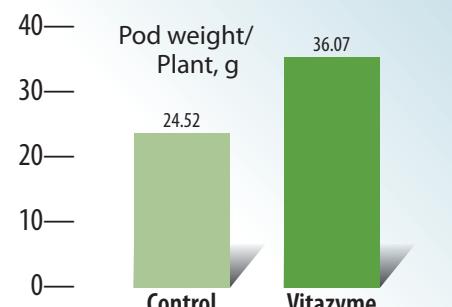
plant. It was not possible to separate the field areas for a yield evaluation, but it is presumed that a considerably greater yield was achieved on the Vitazyme treated area of the field. These results agree with responses of canola to Vitazyme noted in many other places across North America and the world, showing the great efficacy of this program for canola growers.

### Pods per Plant



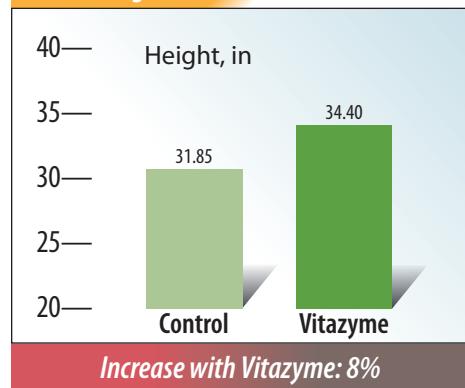
**Increase with Vitazyme: 38%**

### Pod Weight per Plant



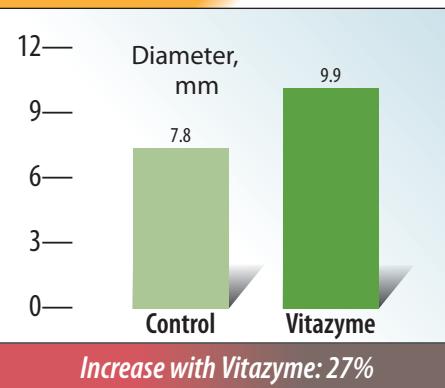
**Increase with Vitazyme: 47%**

### Plant Height



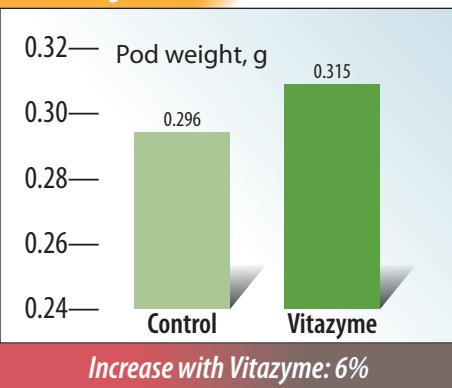
**Increase with Vitazyme: 8%**

### Stalk Diameter



**Increase with Vitazyme: 27%**

### Pod Weight



**Increase with Vitazyme: 6%**

## 2009 Crop Results

# Vitazyme on Canola

Researcher: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine      Seeding rate: 7 kg/ha      Seeding date: August 30, 2008

Location: Ukraine central forest-steppe area near Vinnytsia      Previous crop: spring barley

Variety: Black Giant, super elite      Tillage: plowing, cultivation, and harrowing

Soil type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil "hydrolyzed nitrogen", 15.8 mg/100g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

Experimental design: A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha, replicated four times, to discover the effect of the product on the canola yield.

### 1. Control

### 2. Vitazyme once

### 3. Vitazyme twice

Fertilization: in the fall of 2008, 30 kg/ha N, 60 kg/ha P<sub>2</sub>O<sub>5</sub>, and 90 kg/ha K<sub>2</sub>O; in the spring of 2009, 90 kg/ha of N.

Vitazyme application: Treatment 1 received a fall application at 1.0 liter/ha on October 22, 2008, and Treatment 2 received this treatment plus another in the spring on April 30, 2009, at 1.0 liter/ha.

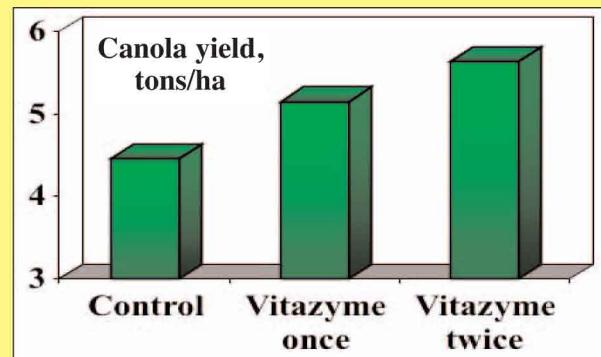
Yield results:

Treatment	Canola yield	Yield change
	tons/ha	tons/ha
1. Control	4.46	—
2. Vitazyme	5.15	0.69 (+15%)
3. Vitazyme, fall + spring application	5.64	1.18 (+26%)

### Increase in canola yield with Vitazyme

**Fall application** ..... 15%

**Fall + Spring application** ..... 26%



Income results:

- **Income increase with fall Vitazyme: 1,663 hrn/ha**
- **Income increase with fall + spring Vitazyme: 2,786 hrn/ha**

Conclusions: This winter canola trial at Vinnytsia, Ukraine, revealed that a single Vitazyme application in the fall, at 1 liter/ha, gave a large yield increase of 15%. An additional spring application at 1 liter/ha provided nearly double the fall-only application: 26%. Both treatments resulted in substantial increases in income, of 1,663 and 2,786 hrn/ha. These results prove the great utility of this product to improve winter canola yields under Ukrainian soil and climatic conditions.

## Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647  
(903) 845-2163 FAX: (903) 845-2262

# 2008 Crop Results

## Vitazyme on Winter Canola

Researchers: O.V. Kornijchuk, V. V. Plotnikov, and agronomic scientists

Organization: Vinnytsia State Agricultural Experiment Station of Forage Institute, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

Location: Ukraine central forest – steppe area of Ukraine near Vinnytsia

Variety: Black Giant Super – Elite

Seeding rate: 6 kg/ha

Soil Type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH = 5.5.

Planting date: August 18, 2007

Previous crop: winter wheat

Tillage: plowing to 22 cm, and cultivation to 3-4 cm

Experimental design: A uniform field area was selected to place 1.0 ha plots, replicated four times, over the test area. The objective was to determine if Vitazyme could favorably influence crop yields for this gray forest soil area of Ukraine.

### 1. Control

### 2. Vitazyme applied in the fall

### 3. Vitazyme applied both fall and spring

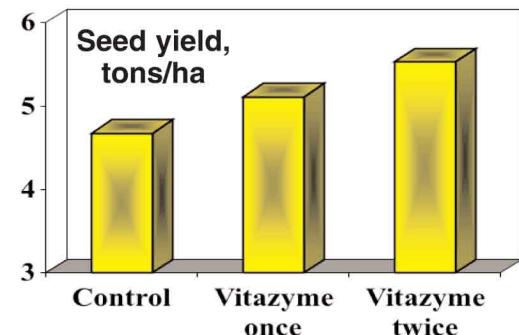
Fertilization: In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O was made. In the spring, 90 kg/ha of nitrogen was applied.

Vitazyme application: for Treatment 2, 1 liter/ha over the leaves and soil on October 5, 2007 (8 to 10 leaves), and for Treatment 3, 1 liter/ha on October 5, 2007, and also 1 liter/ha on May 15, 2008 (bloom).

Harvest date: unknown

Yield results:

Treatment	Seed yield	Change
	tons/ha	tons/ha
Control	4.67	—
Vitazyme 1x	5.11	0.44 (+9%)
Vitazyme 2x	5.53	0.86 (+18%)



**Increase in yield with fall application: 9%**

**Increase in yield with fall and spring applications: 18%**

Income results: Based on current canola prices, the increase in income from Vitazyme for the two treatments is as follows:

Fall application ..... 952 hrn/ha

Fall and spring application ..... 1,855 hrn/ha

Conclusions: A fall application of Vitazyme (1 liter/ha) after planting resulted in a sizeable 9% increase in canola yield in Ukraine. Applying a second 1 liter/ha application in the spring doubled this yield increase to 18%, showing how effective this fertility supplement is to improve yields and profits on canola in Eastern Europe. Income increases were substantial for the two treatments: 952 and 1,855 hrn/ha, respectively.

## Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

## 1999 Crop Results

# Vitazyme on Canola

Farmer: James Harrison

Location: North Yorkshire, England

Variety: Martina (a high uric acid industrial oil variety)

Planting date: unknown

Harvest date: unknown

Soil type: sandy clay loam

Experimental design: A canola field was divided into two parts, one treated with Vitazyme and the "Eco-Ag" System and the other left untreated.

### 1. Control

### 2. Vitazyme + Eco-Ag products

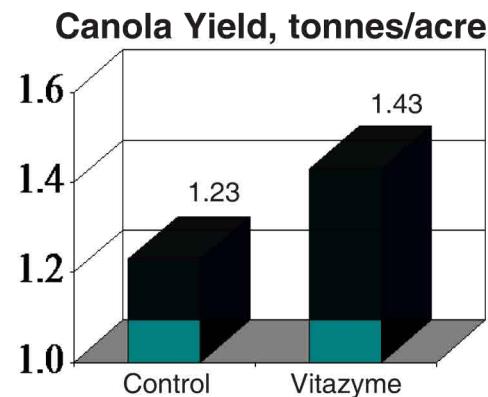
Fertility treatments: no  $P_2O_5$  or  $K_2O$  and reduced nitrogen fertilizer

Vitazyme applications: Vitazyme was applied at recommended rates with other Eco-Ag products.

Yield results:

	<u>Control</u>	<u>Vitazyme</u>	<u>Increase</u>
Yield, tonnes/acre	1.23	1.43	0.20 (+16%)

**Yield increase: 16%**



Income results: Canola price = \$254.40/tonne.

	<u>Control</u>	<u>Vitazyme</u>
Income	\$312.91/acre	\$363.79/acre

**Income increase: \$50.88/acre**

Comments: Using Vitazyme within the Eco-Ag program meant the crop required less fertilizer, especially nitrogen, than the conventional program. Even so, the Eco-Ag program still produced the highest yield and a sizeable income increase.